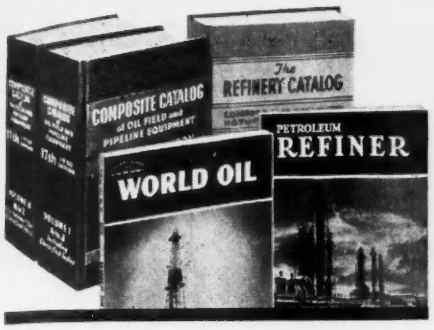

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for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

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CONTENTS

February 15, 1950 **Vol. 130, No. 3**

CURRENT OUTLOOK SECTION

Index to Statistical Tables and Charts ... 21
Publisher's Page: What This Issue Cost ... *Ray L. Dudley* 23
The Changing Panorama, 1949-1950 ... *Warren L. Baker* 25
Petroleum Demand to Show Increase in 1950 ... *L. J. Logan* 28
U. S. Becomes Larger Net Importer in Foreign Oil Trade ... 40
Petroleum Prices Stable After Drop From Postwar Peaks ... 44
Oil Stocks Satisfactory as Year Begins ... 48
Depletion Allowance, Imports Are Major Items in Legislative Outlook ... 52

EXPLORATION SECTION

3.7 Increase Made in Exploratory Drilling ... *Cecil W. Smith* 57
Wildcatting Success Gains Percentagewise in 1949 ... 60
West Texas Leads in Regional Geophysical Activity ... 61
West Texas Strike Highlights U. S. Field Developments ... 62

DRILLING SECTION

38,331 New Wells in 1950 Is Drilling Forecast ... *Elton Sterrett* 75
1949 Well Completions Fewer Than in 1948, But Footage at New Peak ... 80
New Drilling Depth Records Established in 1949 ... 86
Swift Progress Made in New Drilling Methods and Equipment ... *Earle C. Hellums* 88
Faster Performance Causes 13.3 Percent Decrease in Rigs in Operation ... 99
How to Do It—Drilling Hints ... 104

PRODUCTION SECTION

19,889 Wells to Require Pumping Equipment ... *Elton Sterrett* 117
U. S. Crude Production to Climb After 1949 Slump ... 120
Natural Gas Production Will Continue Record Expansion ... 126
Natural Gasoline Output Rises 50 Percent in Five Years ... 132
Proved Petroleum Reserves Increased to New High Level ... 134
California Holds Producing Depth Record by 20-Foot Margin ... 140
9937 Producing Oil Wells Added in 1949 ... 142
Efficiency Increased by New Production Methods and Equipment ... 144
LPG Sales Continue to Soar ... *K. W. Rugh and E. O. Mattocks* 148
Curtailed in 1949, Refinery Output to Continue Below Record Level ... 152
How to Do It—Production Hints ... 156

PIPE LINE SECTION

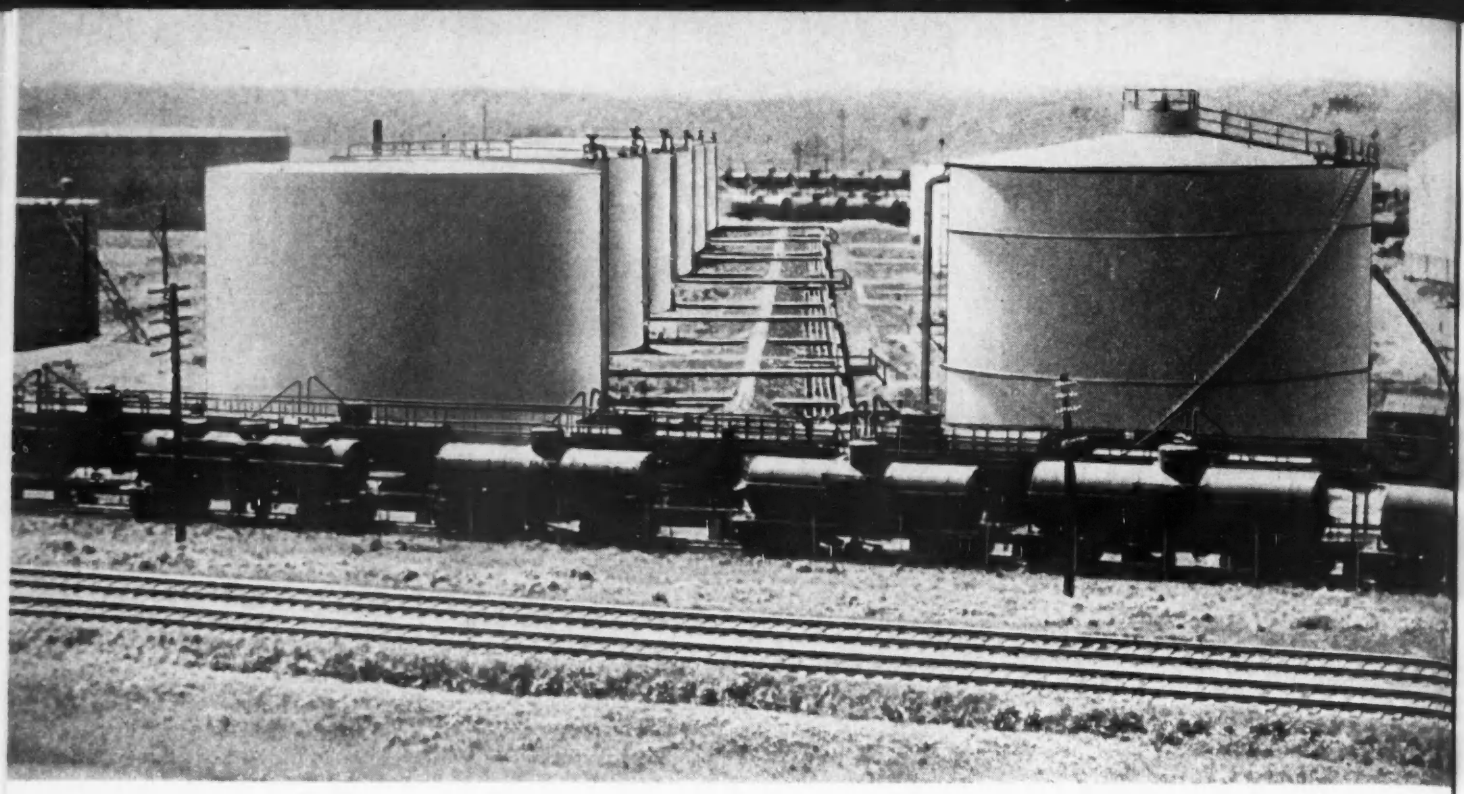
Pipe Line Construction Due for Best Year in 1950 ... 169
Pipe Line Activity in 1949 ... 172
How to Do It—Pipe Line Hints ... 185

INTERNATIONAL SECTION

World Crude Production 1 Percent Short of 1948 Record ... 195
Venezuela Leads in International Movement of Crude ... 210
World Refinery Runs Approach 9 Million Barrels Daily Average in Mid-1949 ... 211
World Development Enters New Phase ... 213

OTHER DEPARTMENTS

The Oil Man's Calendar ... 16
New and Improved Equipment Supplementing Composite Catalog ... 221
Other New and Improved Equipment ... 230
New Literature ... 240
Men in the Industry News ... 242
Associations ... 256
Equipment and Service Suppliers' Notes ... 264
New Books, Maps and Movies ... 282
Squeaks from the Bullwheel ... 284
Advertisers' Index ... 304



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WHAT THIS ISSUE COST

A friend of ours who spends a lot of time preparing surveys, and who consequently is familiar with the problems incidental to the collection of data, writes us that he has had an inquiry as to the estimated cost of duplicating or preparing the material which appears each year in WORLD OIL's Review-Forecast Issue (published Feb. 15 each year).

Despite the fact that we have been doing this work for many years (*The Oil Weekly,* forerunner of WORLD OIL, was the publication which started both the annual review and the forecast idea insofar as the oil business is concerned) we had never applied a dollar and cents yardstick to the work involved. About all we knew, until we began looking into the matter of cost, was that it took a whale of a lot of time!

To begin with, the job is definitely not a one-man job. In our home office alone, eight people finally are involved in record keeping, tabulation and analysis. *That,* of course, is on the material after it gets to our office.

Getting the material is still another job, involving a large number of people, and close contacts with scouting and statistical departments of oil companies, because there is the original source of the information.

In the case of the forecasts which for many years have been a part of the issue, more than 1200 letters are involved, besides numerous telegrams and long distance calls.

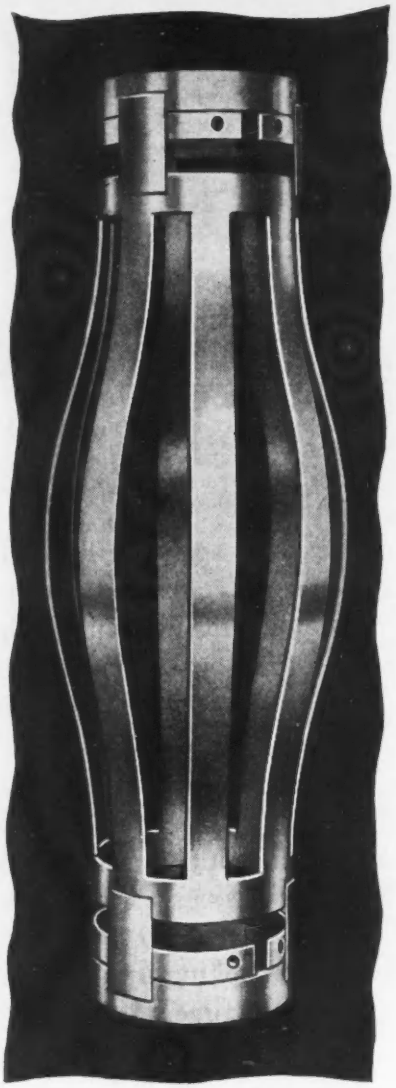
Of course, the material doesn't all flow into our office the last month or week before publication date. Most of the records must be kept weekly or monthly.

Files on basic information involved occupy more space than a fair-sized office contains.

At a rough guess we would say that $50,000, at least, would be necessary to duplicate the contents (not including printing) of the issue you now hold in your hands. *That is more than twice the annual subscription income of* WORLD OIL!

Ray L. Dudley

"TORTURE TESTING" definitely proves Baker Model "G"



Casing Centralizers provide MAXIMUM CENTERING FORCE

Only when "maximum centering force" is applied to casing at the cementing point, can you obtain a sufficient annular space to permit uniform distribution of the cement slurry completely around the casing. The hazard of channeling is minimized, and chances for successful "first time" cementing are increased.

The test of any casing centralizer is its ability to exert MAXIMUM CENTERING FORCE *after* repeated flattening of its springs during the trip down-hole. That's why the Baker testing laboratory has been kept in constant use during the designing, development and actual proving of the Baker Model "G" Casing Centralizer. Comprehensive tests, simulating every conceivable hole condition to which a centralizer is subjected, were performed in arriving at its efficient design.

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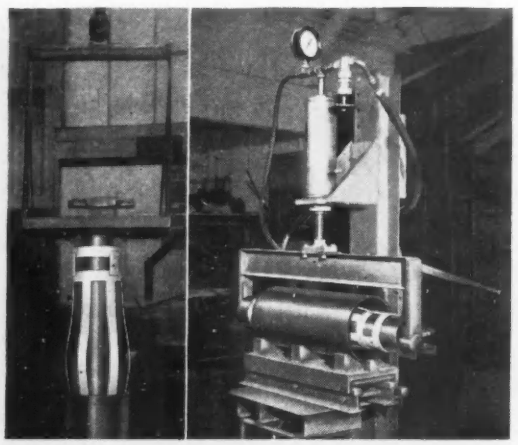
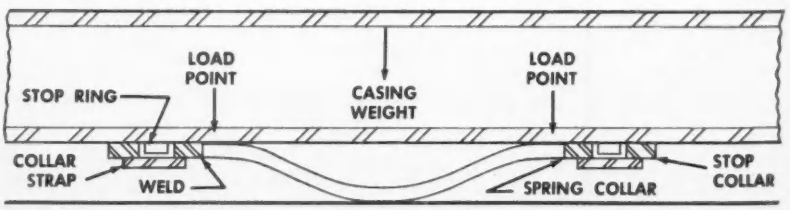
Ask any Baker representative or office for *your* copy of the new 16-page brochure which contains complete details and illustrations of the Baker Model "G" Casing Centralizer.



LEFT: Testing to determine the maximum number of springs of optimum bowed height to permit easy starting without "snubbing." RIGHT: With this testing device it is possible not only to simulate rugged down-hole travel by repeatedly flattening the springs, but also to find the effective centering force of the centralizer in the open hole after such treatment. The MAXIMUM CENTERING FORCE can easily be determined from a performance curve showing the centering force at various intervals of deflection.



Here is the ideal in spring design and mounting, found only in the Baker Model "G" Casing Centralizer. Note how the load point is imposed directly upon the casing; and how the properly "contoured" spring is free to move along the smooth surface of the casing as it deflects under compression. There is no chance for concentration of stress to cause a permanent set, or breaking of the spring. Note that ample clearance exists between Stop Rings and Centralizer Collars to accommodate the increased length of the springs that results from their complete flattening.

***Remember!* You get MAXIMUM CENTERING FORCE only with BAKER Model "G" CASING CENTRALIZERS**

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The Changing Panorama

–1949-1950–

By WARREN L. BAKER
Editor

THE U. S. petroleum industry safely underwent an important transition from shortage to excess supplies during the past year, and can enjoy somewhat improved economic conditions in the year ahead providing it continues to adjust carefully its operations to requirements.

In direct contrast with earlier postwar years, once again, as prior to the war, there was more than enough oil to supply consumptive requirements. Sudden easing of the oil supply-demand relationship resulted in a reversal during 1949 of the industry's heretofore rarely interrupted pattern of producing ever greater amounts to meet rapidly growing consumption. Failure to experience enlarged demand, coupled with greater international competition created by increased production from other countries, made it necessary to curtail U. S. domestic crude production drastically and also to cut refining and drilling activities below 1948 peaks.

Success of the industry in making this transition permits it to face the future in a stronger and more favorable position than seemed probable a year ago. The economic problem ahead for the U. S. oil industry remains one of properly regulating supply to demand levels. This task should be easier than last year, some enlargement being possible in 1950 whereas volumes had to be reached below former rates last year. If crude production and refinery product output are held in proper balance with consumption, economic troubles can be avoided during 1950. The success achieved in controlling supply during the past year presages that the industry can continue solving this difficulty—if it earnestly sets out to do so.

The outlook is brightened by prospects that the drastic reductions necessary in 1949 are to be replaced by resumption of upward trends in both consumption and production. While larger imports and smaller exports are likely to limit U. S. crude production gains to less than normal annual growth, any enlargement is definitely better than the past year's sharp reduction.

Gasoline Only Disturbing Factor

By curtailing producing and refining activities, oversupply problems were solved so successfully that only minor additions were made to stocks during 1949 in contrast with large amounts in 1948. Stocks of gasoline currently are the only factor threatening to disturb the U. S. industry's economic picture.

An excellent job of regulating production levels reduced crude stocks slightly under year ago levels in early February and 18 million barrels under last August volumes.

If refiners had done as fine a job as producers of tailoring their output to consumption needs, the industry would be in a much more stable economic position. However, in anticipation of higher demand than existed, refiners failed to curtail operations quite enough. While stocks of both distillate and residual fuel oil were at satisfactory levels, large additions during early weeks of 1950 boosted gasoline inventories to all-time high volumes by the first part of February. Since this is the off-consuming season for motor fuel, these stocks will continue growing until the end of March. If the recent rate of growth continues, motor fuel inventories may surpass 140 million barrels by the beginning of April in contrast with 128 million barrels a year ago.

While higher prospective consumption will permit the industry to carry a part of this increase, gasoline prices are likely to slump if motor fuel stocks approach 140 million barrels. This would endanger the crude oil market; gasoline being the only refined product offering attractive profit margins, it is doubtful if the refining industry could continue paying present prices for crude.

Immediate reduction of crude runs to still is needed to curb the accumulation of gasoline inventories. This would materially brighten the outlook for the year. The next six weeks will provide the answer to this outstanding question.

Impact of More Foreign Oil

The problem of controlling excess supplies was made more difficult by the impact of a rapid growth in foreign crude production and refining capacity.

While U. S. crude production was reduced by nearly ½ million barrels daily in 1949, production outside this country grew by 400,000 barrels per day in attaining a volume double that of 1941 and 75 percent above 1945 rates. This development reduced U. S. foreign markets and at the same time foreign oil supplied a larger portion of the American domestic market.

This trend will continue a major factor during the coming year. Additional foreign production gains and lack of dollar currency abroad will further depress U. S. export markets in 1950 and probably boost imports of foreign oil into this country.

U. S. exports of petroleum probably will drop to 269,000 barrels daily in 1950, compared with an average of 329,000 barrels last year and 369,000 barrels in 1948.

Meanwhile, U. S. imports of foreign oil rose 24 percent from 513,000 barrels daily in 1948 to 636,000 barrels per day in 1949, and had increased to more than 750,000 barrels daily in early 1950. Although several companies announced during the past month

that they would curtail imports, all signs indicate the importation of larger amounts than in 1949. The U. S. Bureau of Mines has forecast an import rate of 704,000 barrels per day in 1950, a gain of 68,000 barrels. Others foresee greater import volumes.

Although demand failed to increase in 1949, and further shrinkage of U. S. export markets is indicated, a gain in U. S. petroleum consumption appears likely during 1950. A record number of automobiles and oil burners is in service, and it seems reasonable to assume that the important oil burning northeast sector of the nation will experience normally cold temperatures following two consecutive winter seasons of very mild weather. Consequently, domestic use of petroleum should be at least 295,000 barrels greater than in 1950—perhaps more.

Temperance of considerable domestic consumption growth by reduced export markets indicates total demand in 1950 may be held to 6,315,000 barrels, an increase of 3.9 percent or 235,000 barrels.

The consumption level will depend to a great degree on the weather, particularly during the winter months. Abnormally mild temperatures in the northeast sector of the country a year ago and so far this winter have cut heavily into heating oil use. Should this area experience extremely cold temperatures next winter, oil consumption will be above the volume predicted, which is based on normally cold rates but no more.

Small Production Gain

Only a very small increase in U. S. crude production is probable in 1950, as part of the gain in demand

Salient Annual Statistics of the United States

ITEM	THOUSANDS OF BARRELS, EXCEPT AS NOTED				
	1948	1949	Percent Change '48-'49	1950 Forecast	Percent Change '49-'50
Total Demand, All Oils	**2,243,326**	**2,219,324**	**— 1.1**	**2,305,000**	**+ 3.9**
(Daily Average)	6,129	6,080	— 0.8	6,315	+ 3.9
Motor Fuel Demand	908,610	942,676	+ 3.7	981,000	+ 4.1
(Daily Average)	2,483	2,583	+ 4.0	2,688	+ 4.1
Kerosine Demand	115,700	105,190	— 9.1	114,000	+ 8.4
(Daily Average)	316	288	— 8.9	312	+ 8.4
Residual Fuel Oil Demand	513,298	504,334	— 1.7	497,000	— 1.5
(Daily Average)	1,402	1,382	— 1.4	1,362	— 1.5
Distillate Fuel Oil Demand	361,856	338,792	— 6.4	376,000	+ 11.0
(Daily Average)	989	928	— 6.2	1,030	+ 11.0
Lubricating Oils Demand	49,375	45,677	— 7.5	.....	.....
(Daily Average	134	125	— 6.7	.....	.....
Domestic Demand, Total	**2,108,372**	**2,099,065**	**— 0.4**	**2,207,000**	**+ 5.1**
(Daily Average)	5,760	5,751	— 0.2	6,046	+ 5.1
Exports, Total	**134,954**	**120,259**	**— 10.9**	**98,000**	**— 18.5**
(Daily Average)	369	329	— 10.8	269	— 18.5
Crude Oil Exports	39,840	33,247	— 16.5	28,000	— 15.8
(Daily Average)	109	91	— 16.5	77	— 15.8
Refined Oil Exports	95,114	87,012	— 8.5	70,000	— 19.5
(Daily Average)	260	238	— 8.5	192	— 19.5
Crude Runs to Stills, Total	**2,030,670**	**1,943,254**	**— 4.3**	**1,990,000**	**+ 2.4**
(Daily Average)	5,548	5,324	— 4.0	5,452	+ 2.4
Demand for Crude, Total	**2,119,775**	**1,995,862**	**— 5.8**	**2,045,000**	**+ 2.5**
(Daily Average)	5,792	5,468	— 5.6	5,603	+ 2.5
Demand for Domestic Crude	1,990,682	1,841,420	— 7.5	1,872,000	+ 1.7
(Daily Average)	5,439	5,045	— 7.3	5,129	+ 1.7
Crude Oil Production	**2,016,282**	**1,839,615**	**— 8.8**	**1,872,000**	**+ 1.8**
(Daily Average)	5,509	5,040	— 8.5	5,129	+ 1.8
Value at Wells, $ Thousand	5,196,034	4,672,622	— 10.1	.....	.....
Average Value, $ per Barrel	2.57	2.54	— 1.2	.....	.....
Imports, All Oils	**187,709**	**232,159**	**+ 23.7**	**257,000**	**+ 10.7**
(Daily Average)	513	636	+ 24.0	704	+ 10.7
Crude Petroleum Imports	129,093	154,442	+ 19.6	173,000	+ 12.0
(Daily Average)	353	423	+ 19.8	474	+ 12.0
Refined Products Imports	58,616	77,717	+ 32.6	84,000	+ 8.1
(Daily Average)	160	213	+ 33.1	230	+ 8.1
Stocks End of Year All Oils	**605,189**	**614,060**	**+ 1.5**	.....	.....
Crude Oil Stocks	256,254	254,449	— 0.7	.....	.....
Natural Gasoline Stocks	5,579	7,100	+ 27.3	.....	.....
Refined Products Stocks	343,356	352,511	+ 2.7	.....	.....
Motor Fuel Oil Stocks	101,001	112,286	+ 11.2	.....	.....
Kerosine Stocks	23,895	20,838	— 12.8	.....	.....
Residual Fuel Oil Stocks	63,993	61,675	— 3.6	.....	.....
Distillate Fuel Oil Stocks	71,381	77,801	+ 9.0	.....	.....
Lubricating Oils Stocks	9,843	9,300	— 5.5	.....	.....

likely will be met from refined product stocks already on hand, increased imports and enlarged domestic natural gasoline production.

In contrast with a probable gain of 235,000 barrels in demand, daily average crude output of 5,129,000 barrels per day is predicted for the U. S. in 1950, which is only 89,000 barrels or 1.8 percent greater than 1949 levels. Even this modest increase is encouraging in view of the drastic reduction which occurred last year. U. S. crude production in 1949 was 469,000 barrels per day under the peak reached in 1948, as it became necessary to curtail output drastically to hold supply in balance with demand.

If imports attain a volume in excess of 704,000 barrels daily and consumption is not greatly above 6,315,000 barrels daily, U. S. production necessarily will have to be reduced from the above estimates.

Less Drilling Indicated

With an ample supply on hand, both domestically and in foreign areas, and with only a small gain in production indicated, conditions are not conducive for the drilling of a large number of wells. Consequently, U. S. completions for 1950 are forecast at 38,534 wells (exclusive of old wells drilled deeper), a decline of 0.5 percent or only 203 wells from the 1949 rate. However, the amount of footage drilled is expected to reach an all-time high of 139,684,000 feet, an increase of 1.5 percent or 2,058,288 feet.

Should the industry experience a crude price cut, drilling activity would decrease and fail to reach the volumes indicated at this particular time.

Salient Annual Statistics of the United States

ITEM	NUMBER, EXCEPT AS NOTED				
	1948	1949	Percent Change '48-'49	1950 Forecast	Percent Change '49-'50
Natural Gasoline Production, Thous. Bbls.	**145,479**	**156,232**	**+ 7.4**	**165,640**	**+ 6.0**
(Daily Average)	397	428	+ 7.8	454	+ 6.1
Natural Gas, Marketed Production, Biln. Cu. Ft.	**5,148**	**5,766**	**+ 12.0**	**6,500**	**+ 12.7**
Value at Consumption Points ¢ per M. Cu. Ft.	23.2	24.0	+ 3.4	.....	.....
Value at Wells ¢ per M. Cu. Ft	6.5	7.0	+ 7.7	.....	.....
Pipe Line Construction, Miles	**14,821**	**12,564**	**— 15.2**	**26,499**	**+110.9**
Oil Lines Completed, Miles	5,669	3,634	— 35.9	2,663	— 26.7
Gas Lines Completed, Miles	7,414	8,493	+ 14.6	21,740	+156.0
Product Lines Completed, Miles	1,738	437	— 74.9	2,055	+370.3
Crude Reserves, Year-End, Miln. Bbls.	**23,280**	**25,018**	**+ 7.5**	.....	.....
New Crude Reserves Proved, Miln. Bbls.	**3,795**	**3,557**	**+ 6.3**	.....	.....
New Fields and Pays Found	**1,192**	**1,230**	**+ 3.2**	.....	.....
New Oil Discoveries	**917**	**959**	**+ 4.6**	.....	.....
New Fields	610	675	+ 10.7	.....	.....
New Pays	307	284	— 7.5	.....	.....
New Gas Discoveries	**160**	**150**	**— 6.3**	.....	.....
New Fields	112	122	+ 8.9	.....	.....
New Pays	48	28	— 41.7	.....	.....
New Distillate Discoveries	**115**	**121**	**+ 5.2**	.....	.....
New Fields	70	69	— 1.4	.....	.....
New Pays	45	52	+ 15.6	.....	.....
Exploratory Wells Drilled	**6,843**	**7,464**	**+ 9.1**	**7,515**	**+ 0.7**
Productive	1,347	1,522	+ 13.0	.....	.....
Non-Productive	5,496	5,942	+ 8.1	.....	.....
Well Completions, Total	**40,010**	**39,015**	**— 2.5**	.....	.....
New Wells, Total	39,477	38,534	— 2.4	38,331	— 0.5
Oil Wells	22,197	21,352	— 3.8	.....	.....
Gas Wells	2,966	2,984	+ 0.6	.....	.....
Distillate Wells	346	379	+ 9.5	.....	.....
Dry Holes	11,939	12,597	+ 10.6	.....	.....
Gas Input Wells	84	146	+ 73.8	.....	.....
Water Input Wells	1,885	1,018	— 46.0	.....	.....
Water Disposal Wells	60	58	— 3.3	.....	.....
Old Wells Drilled Deeper	533	481	— 9.8	.....	.....
Footage Drilled, Thousand Feet	**137,103**	**138,017**	**+ 0.7**	.....	.....
Footage Drilled, New Wells	136,709	137,626	+ 0.7	139,684	+ 1.5
Wells Drilling, End of Year	**4,908**	**4,355**	**— 11.3**	.....	.....
Producing Oil Wells, End of Year	**439,608**	**449,545**	**+ 2.3**	.....	.....
Flowing Oil Wells	50,036	51,254	+ 2.4	.....	.....
Pumping Oil Wells	389,572	398,291	+ 2.2	.....	.....

PETROLEUM DEMAND

To Show Increase in 1950

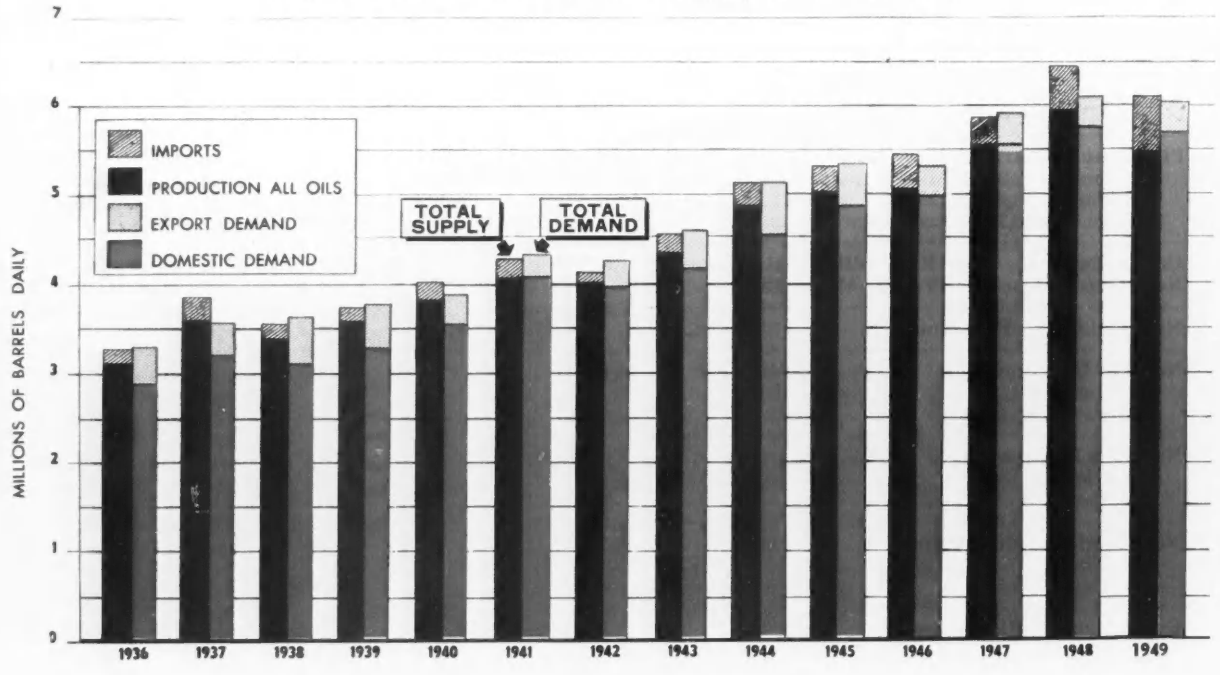
By L. J. LOGAN
Associate Editor

EXPECTED demand for petroleum products in 1950, as forecast by the U. S. Bureau of Mines, will require U. S. crude production averaging 5,129,000 barrels daily, an increase of 1.7 percent over the 5,045,000 daily produced in 1949, according to the bureau's computations.

This estimate assumes no change in 1950 in crude stocks but a net reduction of 10 million barrels (27,000 daily) in stocks of refined products. It makes allowance for U. S. production of 455,000 barrels per day of natural gasoline and related products for partially meeting requirements, an increase of 6.1 percent over the 428,000 daily produced in 1949.

Finally, the bureau estimates that needs will be met to the extent of 704,000 barrels daily by imports, an increase of 10.7 percent over the imports of 636,000 daily in 1949. The 704,000 of imports would include 474,000 of crude, up 12.0 percent over 423,000 daily in 1949, and 230,000 daily of refined products, up 8.1 percent

United States Petroleum Supply and Demand



Thousands of Barrels Daily

YEAR	SUPPLY: U. S. Prod. All Oils[1]	SUPPLY: Total Imports[2]	SUPPLY: Total New Supply	Change in Stocks All Oils[3]	DEMAND: Domestic Demand[4]	DEMAND: Exports and Shipments[5]	DEMAND: Total Demand
1936	3,128	156	3,284	—62	2,986	360	3,346
1937	3,647	157	3,804	+126	3,205	473	3,678
1938	3,472	149	3,621	—25	3,115	531	3,646
1939	3,614	162	3,776	—115	3,373	518	3,891
1940	3,858	229	4,087	+106	3,625	356	3,981
1941	4,073	266	4,339	—30	4,071	298	4,369
1942	4,034	99	4,133	—160	3,972	321	4,293
1943	4,372	174	4,546	—33	4,168	411	4,579
1944	4,864	252	5,116	—17	4,562	571	5,133
1945	5,010	311	5,321	—37	4,857	501	5,358
1946	5,073	377	5,450	+119	4,912	419	5,331
1947	5,451	437	5,888	—14	5,451	451	5,902
1948	5,907	513	6,420	+291	5,760	369	6,129
1949	5,468	636	6,104	+24	5,751	329	6,080
1950 Est.	5,584	704	6,288	—27	6,046	269	6,315

[1] Includes crude oil, natural gasoline, related products, and benzol. [2] Includes both refined and crude oils. [3] Includes changes in both refined and crude oil stocks. Minus signs indicate decreases and plus signs increases. [4] Includes military and civilian demand in continental United States and shipments to U. S. armed forces abroad. [5] Includes shipments to non-contiguous territories.

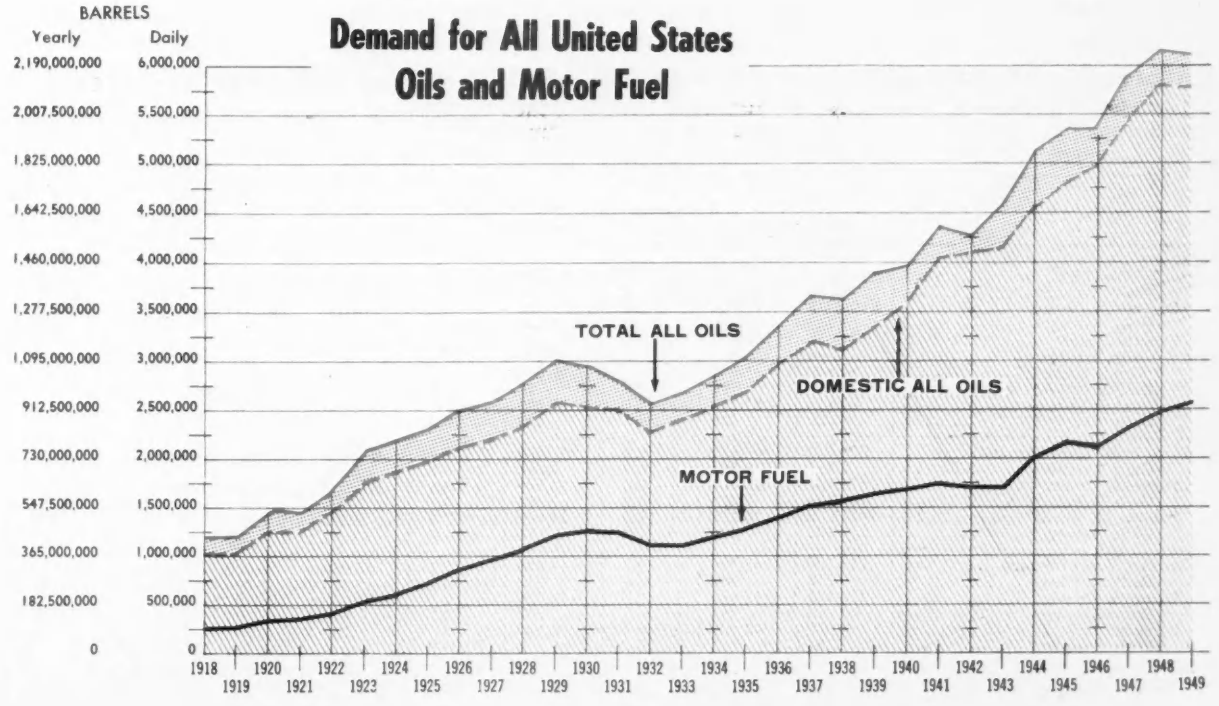
Source: Data from U. S. Bureau of Mines, except November and December, 1949, estimated by WORLD OIL

from 213,000 daily in 1949.

While the demand for domestic crude is thus figured at 5,129,000 barrels daily average for 1950, the requirements by quarters are estimated at 5,133,000 daily in the first quarter, 5,033,000 daily in the second quarter, 5,136,000 daily in the third quarter, and 5,212,000 daily in the fourth quarter.

Several important factors may require revision of this original forecast of crude production requirements as the year progresses, either upward or downward. Nearly all business forecasts for 1950 have been firm for the first half of the year but less certain about the latter half, which is conceded to hold possibilities of some slowing down of industry and business activity. However, demand for petroleum is remarkably stable even in the face of business setbacks.

Aside from possibilities of necessary revisions in forecasts of demand, the requirements for U. S. crude production may vary from the above projected rates in so far as the year brings different trends from those forecast for changes



Demand for All United States Oils and Motor Fuel

Demand for All Oils — Demand for Motor Fuel

(All Figures in Barrels)

YEAR	TOTAL (Domestic and Export) Annual Total	TOTAL (Domestic and Export) Daily Average	DOMESTIC Annual Total	DOMESTIC Daily Average	EXPORTS Annual Total	EXPORTS Daily Average	TOTAL (Domestic and Export) Annual Total	TOTAL (Domestic and Export) Daily Average	DOMESTIC Annual Total	DOMESTIC Daily Average	EXPORTS Annual Total	EXPORTS Daily Average
1918.....	.....	.....	.....	.....	.....	.....	93,599,000	256,400	79,949,000	219,000	13,650,000	37,000
1919.....	438,434,000	1,201,200	374,541,000	1,026,100	63,893,000	175,100	97,790,000	267,900	88,648,000	242,900	9,142,000	25,000
1920.....	535,382,000	1,462,800	456,764,000	1,245,300	79,618,000	217,500	124,623,000	340,500	108,945,000	297,700	15,678,000	42,800
1921.....	592,402,000	1,450,400	457,521,000	1,253,300	71,881,000	196,900	130,203,000	356,700	116,840,000	320,100	13,363,000	36,600
1922.....	605,540,000	1,659,000	539,990,000	1,454,800	74,550,000	204,200	152,132,000	416,800	137,770,000	377,500	14,362,000	39,300
1923.....	754,361,000	2,066,700	652,027,000	1,786,400	102,334,000	280,300	195,556,000	535,800	174,462,000	478,000	21,094,000	57,800
1924.....	805,070,000	2,199,600	687,742,000	1,879,100	117,328,000	320,500	225,737,000	616,800	196,586,000	537,100	29,151,000	79,700
1925.....	840,818,000	2,303,600	726,797,000	1,991,200	114,021,000	312,400	264,429,000	724,500	232,745,000	637,700	31,684,000	86,800
1926.....	912,893,000	2,501,100	780,487,000	2,138,300	132,406,000	362,800	311,897,000	854,500	268,128,000	734,600	43,769,000	119,900
1927.....	944,762,000	2,588,400	802,499,000	2,198,600	142,263,000	389,800	350,318,000	959,800	305,367,000	836,600	44,951,000	123,200
1928.....	1,014,716,000	2,772,400	859,759,000	2,349,000	154,957,000	423,400	392,293,000	1,071,800	338,881,000	925,900	53,412,000	145,900
1929.....	1,103,203,000	3,022,500	940,083,000	2,575,600	163,120,000	446,900	444,937,000	1,219,000	382,878,000	1,049,000	62,059,000	170,000
1930.....	1,083,511,000	2,968,500	927,016,000	2,539,800	156,495,000	428,700	463,184,000	1,269,000	397,609,000	1,089,300	65,575,000	179,700
1931.....	1,027,274,000	2,814,500	902,920,000	2,473,800	124,354,000	340,700	453,559,000	1,242,600	407,843,000	1,117,400	45,716,000	125,200
1932.....	938,757,000	2,564,900	835,482,000	2,282,700	103,275,000	282,200	413,229,000	1,129,000	377,791,000	1,032,200	35,438,000	96,800
1933.....	975,214,000	2,671,800	868,487,000	2,379,400	106,727,000	292,400	409,815,000	1,122,800	380,494,000	1,042,500	29,321,000	80,300
1934.....	1,034,672,000	2,834,700	920,165,000	2,521,000	114,507,000	313,700	435,025,000	1,191,800	410,339,000	1,124,200	24,686,000	67,600
1935.....	1,112,672,000	3,048,400	983,685,000	2,695,000	128,987,000	353,400	465,423,000	1,275,100	434,810,000	1,191,200	30,613,000	83,900
1936.....	1,224,748,000	3,346,300	1,092,754,000	2,985,700	131,994,000	360,600	510,252,000	1,394,100	481,606,000	1,315,800	28,646,000	78,300
1937.....	1,342,516,000	3,678,100	1,169,682,000	3,204,600	172,834,000	473,500	557,658,000	1,527,800	519,352,000	1,422,900	38,306,000	104,900
1938.....	1,330,850,000	3,646,200	1,137,122,000	3,115,400	193,728,000	530,800	573,112,000	1,570,200	523,003,000	1,432,900	50,109,000	137,300
1939.....	1,420,035,000	3,890,500	1,231,067,000	3,372,800	188,959,000	517,700	600,147,000	1,644,200	555,509,000	1,521,900	44,638,000	122,300
1940.....	1,457,086,000	3,981,100	1,326,620,000	3,624,600	130,466,000	356,500	614,867,000	1,679,900	589,490,000	1,610,600	25,377,000	69,300
1941.....	1,594,609,000	4,368,800	1,485,779,000	4,070,600	108,830,000	298,200	694,588,000	1,903,000	667,505,000	1,828,800	27,083,000	74,200
1942.....	1,566,815,000	4,292,600	1,449,908,000	3,972,300	116,907,000	320,300	624,207,000	1,710,200	589,110,000	1,614,000	35,097,000	96,200
1943.....	1,671,383,000	4,579,100	1,521,426,000	4,168,300	149,957,000	410,800	619,815,000	1,698,100	568,238,000	1,556,800	51,577,000	141,300
1944.....	1,878,879,000	5,133,600	1,671,263,000	4,566,300	207,616,000	567,300	733,019,000	2,002,800	632,482,000	1,728,100	100,537,000	274,700
1945.....	1,955,668,000	5,358,000	1,772,685,000	4,856,700	182,983,000	501,300	784,392,000	2,149,000	696,333,000	1,907,800	88,059,000	241,200
1946.....	1,945,909,000	5,331,200	1,792,786,000	4,911,700	153,123,000	419,500	780,751,000	2,139,000	735,417,000	2,014,800	45,334,000	124,200
1947.....	2,154,280,000	5,902,100	1,989,803,000	5,451,500	164,477,000	450,600	842,464,000	2,308,100	795,015,000	2,178,100	47,449,000	130,000
1948.....	2,243,326,000	6,129,300	2,108,372,000	5,760,600	134,954,000	368,700	908,610,000	2,482,500	871,200,000	2,380,300	37,410,000	102,200
1949.....	2,219,324,000	6,080,300	2,099,065,000	5,750,900	120,259,000	329,400	942,676,000	2,582,700	902,561,000	2,472,800	40,115,000	109,900
1950 Est..	2,305,000,000	6,315,100	2,207,000,000	6,046,600	98,000,000	268,500	981,000,000	2,687,700	952,000,000	2,608,200	29,000,000	79,500

Source: U. S. Bureau of Mines except for 1949 which has been estimated by WORLD OIL with aid of Bureau statistics for 10 months.

in stocks and imports. As forecast, 27,000 barrels a day of demand will be met by drawing on refined products stocks. If stocks actually are not reduced, proportionally more crude production might be needed. Similarly, required domestic crude production would be higher if imports should be less than the projected 704,000 barrels daily, but lower if they exceed that rate. Recent developments indicate actual imports in 1950 may be higher than assumed in the Bureau of Mines original forecast. Although several major importing companies have announced downward revisions in their originally scheduled imports for the first half of the year, these reductions still indicate imports during the first six months of 1950 may average 750,000 barrels daily. Moreover, imports in December averaged 752,000 barrels per day. The possibility that imports may exceed the bureau forecast makes it appear that estimates of requirements for domestic crude production may have to be revised downward to some extent.

In meeting the demand for petroleum products in 1950, crude runs to stills at refineries must average 5,452,000 barrels daily, the Bureau of Mines has estimated. This would be an increase of 2.4 percent over the runs of 5,324,000 barrels per day in 1949. The runs in 1949 had been 4

Forecast of Petroleum Demand and Supply in 1950, Compared with 1949 and 1948

(All data from U. S. Bureau of Mines except 1949 includes estimates by WORLD OIL with aid of American Petroleum Institute reports)

(THOUSANDS OF BARRELS)

	1948	1949	% Diff. '48-'49	1950 Forecast	% Diff. '49-'50	1950 FORECAST BY QUARTERS 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
DEMAND:									
All Oils, Total Demand	2,243,326	**2,219,324**	— 1.1	**2,305,000**	+ 3.9	586,000	548,000	561,000	610,000
(Daily Average)	6,129	**6,080**	— 0.8	**6,315**	+ 3.9	6,511	6,022	6,098	6,630
Domestic Demand	2,108,372	**2,099,065**	— 0.4	**2,207,000**	+ 5.1	562,000	521,000	536,000	588,000
(Daily Average)	5,760	**5,751**	— 0.2	**6,046**	+ 5.1	6,244	5,725	5,826	6,391
Exports, Total	134,954	**120,259**	— 10.9	**98,000**	— 18.5	24,000	27,000	25,000	22,000
(Daily Average)	369	**329**	— 10.8	**269**	— 18.5	267	297	272	239
Crude Exports	39,840	**33,247**	— 16.5	**28,000**	— 15.8	7,000	9,000	7,000	5,000
(Daily Average)	109	**91**	— 16.5	**77**	— 15.8	78	99	76	54
Refined Exports	95,114	**87,012**	— 8.5	**70,000**	— 19.5	17,000	18,000	18,000	17,000
(Daily Average)	260	**238**	— 8.5	**192**	— 19.5	189	198	196	185
Motor Fuel, Total Demand	908,610	**942,676**	+ 3.7	**981,000**	+ 4.1	209,000	260,000	266,000	246,000
(Daily Average)	2,483	**2,583**	+ 4.0	**2,688**	+ 4.1	2,322	2,857	2,891	2,674
Domestic Demand	871,200	**902,561**	+ 3.6	**952,000**	+ 5.5	203,000	252,000	258,000	239,000
(Daily Average)	2,381	**2,473**	+ 3.9	**2,608**	+ 5.5	2,255	2,769	2,804	2,598
Exports	37,410	**40,115**	+ 7.2	**29,000**	— 27.7	6,000	8,000	8,000	7,000
(Daily Average)	102	**110**	+ 7.8	**80**	— 27.7	67	88	87	76
Kerosine, Total Demand	115,700	**105,190**	— 9.1	**114,000**	+ 8.4	38,000	19,000	20,000	37,000
(Daily Average)	316	**288**	— 8.9	**312**	+ 8.4	422	209	218	402
Domestic Demand	112,165	**102,664**	— 8.5	**112,000**	+ 9.1	37,500	18,500	19,500	36,500
(Daily Average)	306	**281**	— 8.2	**307**	+ 9.1	416	203	212	396
Exports	3,535	**2,526**	— 28.5	**2,000**	— 20.8	500	500	500	500
(Daily Average)	10	**7**	— 30.0	**5**	— 20.8	6	6	6	6
Distillate Fuel Oil, Total Demand	361,856	**338,792**	— 6.4	**376,000**	+ 11.0	125,000	69,000	67,000	115,000
(Daily Average)	989	**928**	— 6.2	**1,030**	+ 11.0	1,389	758	728	1,250
Domestic Demand	340,048	**326,284**	— 4.0	**367,000**	+ 12.5	122,000	67,000	65,000	113,000
(Daily Average)	929	**894**	— 3.8	**1,005**	+ 12.5	1,356	736	706	1,228
Exports	21,808	**12,508**	— 42.7	**9,000**	— 28.0	3,000	2,000	2,000	2,000
(Daily Average)	60	**34**	— 43.3	**25**	— 28.0	33	22	22	22
Residual Fuel Oil, Total Demand	513,298	**504,334**	— 1.7	**497,000**	— 1.5	139,000	116,000	113,000	129,000
(Daily Average)	1,402	**1,382**	— 1.4	**1,362**	— 1.5	1,545	1,275	1,228	1,402
Domestic Demand	500,759	**491,716**	— 1.8	**487,000**	— 1.0	136,500	113,500	110,500	126,500
(Daily Average)	1,368	**1,347**	— 1.5	**1,334**	— 1.0	1,517	1,248	1,201	1,375
Exports	12,539	**12,618**	+ 0.6	**10,000**	— 20.7	2,500	2,500	2,500	2,500
(Daily Average)	34	**35**	+ 2.9	**28**	— 20.7	28	27	27	27
*All Other Oils, Total Demand	343,862	**328,332**	— 4.5	**337,000**	+ 2.6	75,000	84,000	95,000	83,000
(Daily Average)	939	**899**	— 4.3	**923**	+ 2.6	833	923	1,033	902
Domestic Demand	284,200	**275,840**	— 2.9	**289,000**	+ 4.8	63,000	70,000	83,000	73,000
(Daily Average)	776	**756**	— 2.6	**792**	+ 4.8	700	769	903	794
Exports	59,662	**52,492**	— 12.0	**48,000**	— 8.6	12,000	14,000	12,000	10,000
(Daily Average)	163	**143**	— 12.3	**131**	— 8.6	133	154	130	108
Change in Stocks, All Oils	+ 106,502	**+8,871**	.....	**—10,000**	.....	—14,000	+9,000	+13,000	—18,000
(Daily Average)	+291	**+24**	.....	**—27**	.....	—155	+99	+141	—195
Crude Oil	+25,600	**—1,805**	.....	.....	.....	.....	.....	.....	.....
(Daily Average)	+70	**—5**	.....	.....	.....	.....	.....	.....	.....
Other Oils	+80,902	**+10,676**	.....	**—10,000**	.....	—14,000	+9,000	+13,000	—18,000
(Daily Average)	+221	**+29**	.....	**—27**	.....	—155	+99	+141	—195
NEW SUPPLY:									
Total New Supply	2,349,828	**2,228,195**	— 5.2	**2,295,000**	+ 3.0	572,000	557,000	574,000	592,000
(Daily Average)	6,420	**6,104**	— 4.9	**6,288**	+ 3.0	6,356	6,121	6,239	6,435
Domestic Production, Total	2,162,119	**1,996,036**	— 7.7	**2,038,000**	+ 2.1	503,000	497,000	514,000	524,000
(Daily Average)	5,907	**5,468**	— 7.4	**5,584**	+ 2.1	5,589	5,462	5,587	5,696
Crude Oil	2,016,282	**1,839,615**	— 8.8	**1,872,000**	+ 1.8	462,000	458,000	472,500	479,500
(Daily Average)	5,509	**5,040**	— 8.5	**5,129**	+ 1.8	5,133	5,033	5,136	5,212
Other Oils	145,837	**156,421**	+ 7.3	**166,000**	+ 6.1	41,000	39,000	41,500	44,500
(Daily Average)	398	**428**	+ 7.5	**455**	+ 6.1	456	429	451	484
Imports, Total	187,709	**232,159**	+ 23.7	**257,000**	+ 10.7	69,000	60,000	60,000	68,000
(Daily Average)	513	**636**	+ 24.0	**704**	+ 10.7	767	659	652	739
Crude Oil	129,093	**154,442**	+ 19.6	**173,000**	+ 12.0	42,000	43,000	44,000	44,000
(Daily Average)	353	**423**	+ 19.8	**474**	+ 12.0	467	472	478	478
Refined Products	58,616	**77,717**	+ 32.6	**84,000**	+ 8.1	27,000	17,000	16,000	24,000
(Daily Average)	160	**213**	+ 33.1	**230**	+ 8.1	300	187	174	261
Crude Oil Runs to Stills, Total	2,030,670	**1,943,254**	— 4.3	**1,990,000**	+ 2.4	490,500	485,500	503,000	511,000
(Daily Average)	5,548	**5,324**	— 4.0	**5,452**	+ 2.4	5,450	5,335	5,465	5,556
Demand for Domestic Crude, Total	1,990,682	**1,841,420**	— 7.5	**1,872,000**	+ 1.7	462,000	458,000	472,500	479,500
(Daily Average)	5,439	**5,045**	— 7.3	**5,129**	+ 1.7	5,133	5,033	5,136	5,212

* Includes crude oil (used as fuel, losses and exports); liquefied gases; lubricants; petroleum coke; asphalt; road oil, etc., and refinery losses.

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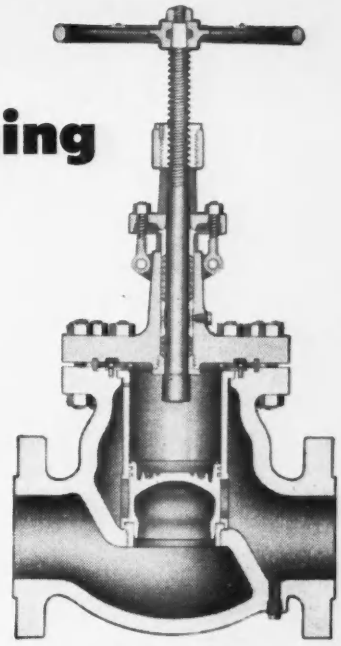

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Globe Pattern
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Sizes: 4 to 12 in.

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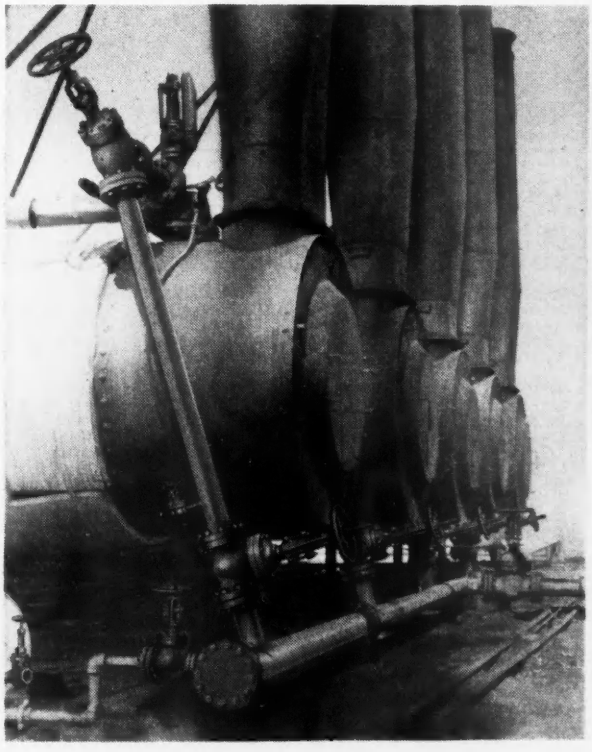

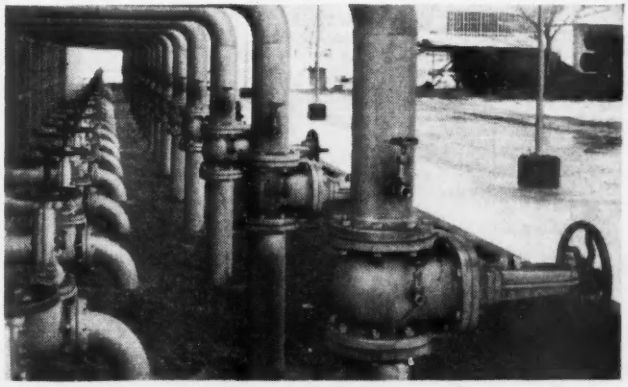

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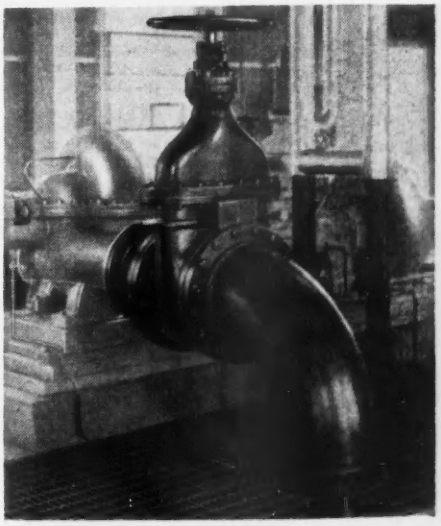
FIELD BOILERS *equipped with Automatic Stop-Checks, Clamp Gates, and Cast Steel Wedge Gate Valves—all from Crane.*



WATER CIRCULATING PUMP *in natural gasoline plant, showing Crane 125-Pound Iron Body Wedge Gate Valve.*

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CRANE

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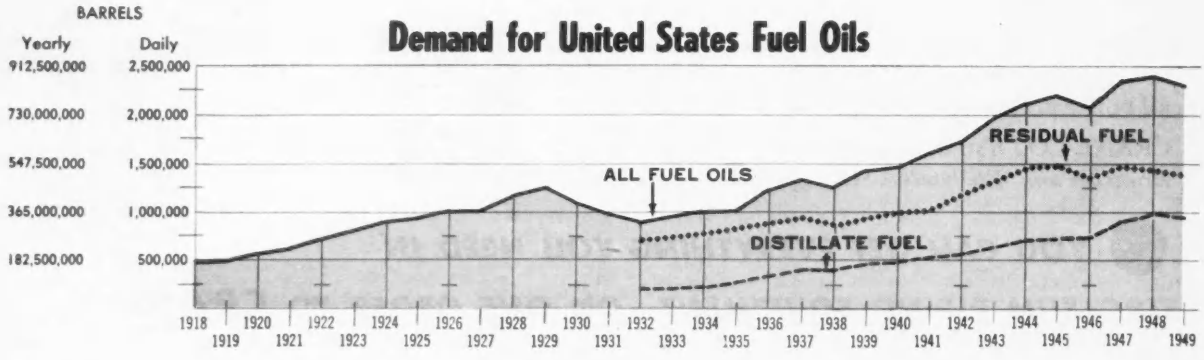
percent under the all-time peak of 5,548,000 barrels per day in 1948.

As estimated by the Bureau of Mines, total demand for all oils will average 6,315,000 barrels daily in 1950, a new all-time high and an increase of 3.9 percent over the demand of 6,080,000 barrels per day in 1949. The total demand in 1949 had been only .8 of 1 percent less than the 6,129,000 barrels per day of 1948, highest so far on record.

The increase for 1950 in total demand for all oils is expected in spite of an anticipated further decline in exports by 18.5 percent, as domestic requirements are expected to show an increase of 5.1 percent to a new all-time peak of 6,046,000 barrels daily from 5,751,000 daily in 1949. The domestic demand in 1949 was only .2 of 1 percent less than the 5,760,000 barrels per day in 1948, record high up to now.

Total exports of crude and refined oils in 1950 are estimated at 269,000 barrels per day, down 18.5 percent from the 329,000 daily of 1949, which in turn had been 10.8 percent less than the 369,000 daily of 1948. Exports have been declining for several years, due to postwar rehabilitation and expansion of the industry in countries outside the U. S. and because of the problem of dollar exchange. In 1950, exports of both crude oil and refined products are expected to decline.

Besides the postwar conditions causing a sharp downward trend in exports since 1947, there have been abnormal conditions affecting domestic demand, including the general economic readjustments of late 1948 and 1949, abnormal weather conditions, and other factors. Abnormally mild weather in the first and last quarters of 1949 retarded the growth in domestic demand for heating oils. Growth in demand for oil is being affected materially by the very rapid increase in production and distribution of natural gas. Consumption of residual fuel oil by railroad locomotives has been reduced one-third in the past two years,



Demand for United States Fuel Oils

All Figures in Barrels

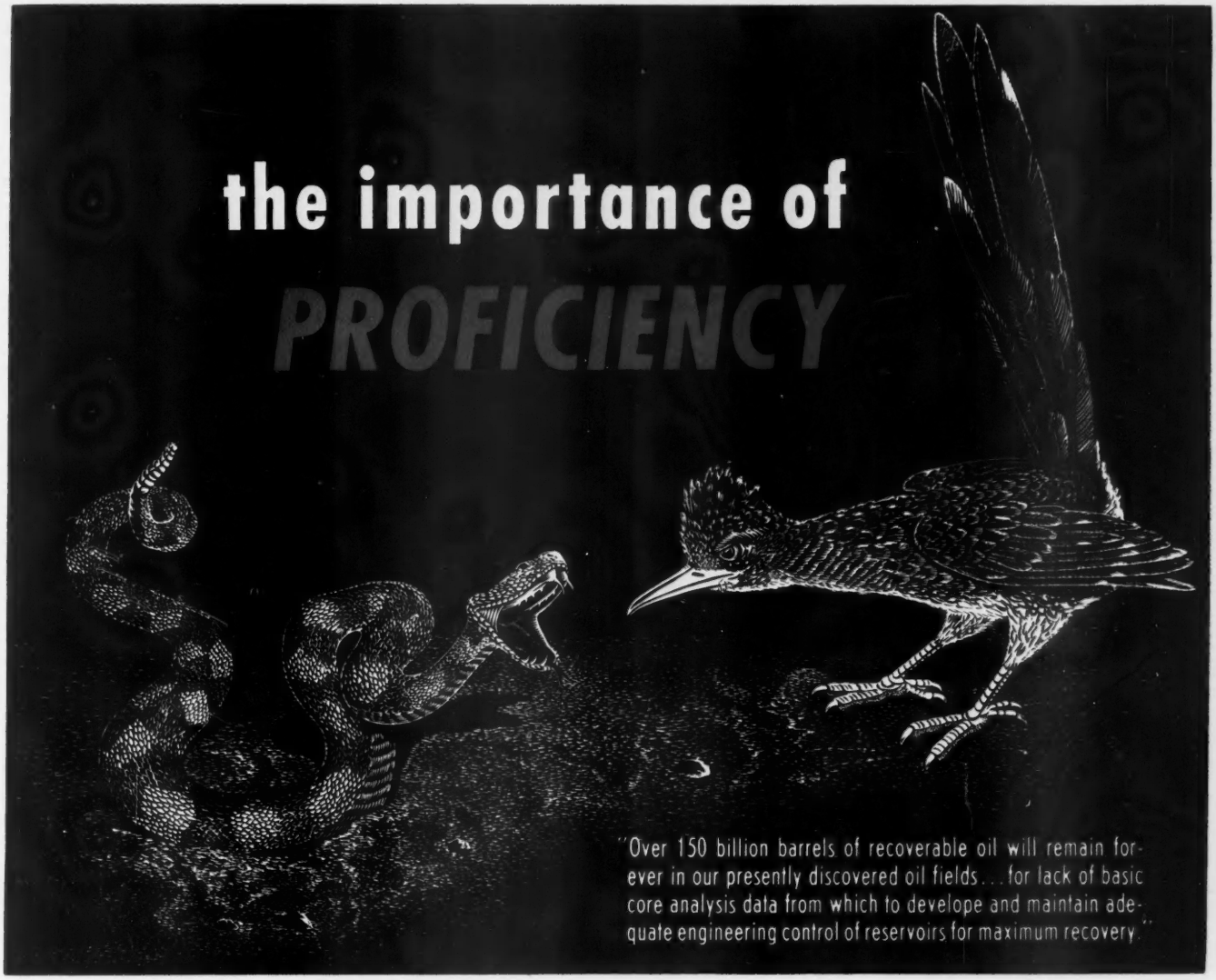
YEAR	TOTAL DEMAND (Domestic and Export) Annual Total	TOTAL DEMAND (Domestic and Export) Daily Average	DOMESTIC DEMAND Annual Total	DOMESTIC DEMAND Daily Average	EXPORTS Annual Total	EXPORTS Daily Average
* All Fuel Oils (Distillate & Residual)						
1918	172,387,000	472,300	142,751,000	391,100	29,636,000	81,200
1919	180,290,000	494,000	163,803,000	448,800	16,487,000	45,200
1920	208,052,000	568,400	185,972,000	508,100	22,080,000	60,300
1921	218,332,000	598,100	195,656,000	536,000	22,676,000	62,100
1922	255,542,000	700,100	237,063,000	649,500	18,479,000	50,600
1923	294,760,000	807,500	261,388,000	716,100	33,372,000	91,400
1924	328,015,000	896,200	290,766,000	794,400	37,249,000	101,800
1925	343,092,000	940,000	307,004,000	841,100	36,088,000	98,900
1926	377,923,000	1,035,400	339,572,000	930,300	38,351,000	105,100
1927	386,656,000	1,059,300	339,265,000	929,500	47,391,000	129,800
1928	428,401,000	1,170,500	383,974,000	1,049,100	44,427,000	121,400
1929	454,307,000	1,244,700	415,156,000	1,137,400	39,151,000	107,300
1930	404,981,000	1,109,600	368,531,000	1,009,700	36,450,000	99,900
1931	363,899,000	997,000	334,668,000	916,900	29,231,000	80,100
1932	324,151,000	885,600	304,157,000	831,000	19,994,000	54,600
1933	344,268,000	943,200	323,705,000	886,900	20,563,000	56 300
1934	368,976,000	1,010,900	340,371,000	932,500	28,605,000	78,400
1935	395,671,000	1,084,000	366,723,000	1,004,700	28,948,000	79,300
1936	445,524,000	1,217,300	410,641,000	1,122,000	34,883,000	95,300
1937	487,788,000	1,336,400	442,355,000	1,211,900	45,433,000	124,500
1938	456,843,000	1,251,600	409,282,000	1,121,300	47,561,000	130,300
1939	507,966,000	1,391,700	458,461,000	1,256,100	49,505,000	135,600
1940	536,263,000	1,465,200	501,014,000	1,368,900	35,249,000	96,300
1941	587,285,000	1,609,000	556,246,000	1,524,000	31,039,000	85,000
1942	625,028,000	1,712,400	591,358,000	1,620,200	33,670,000	92,200
1943	714,969,000	1,958,800	675,118,000	1,849,600	39,851,000	109,200
1944	777,367,000	2,124,000	721,340,000	1,970,900	56,027,000	153,100
1945	794,672,000	2,177,200	749,507,000	2,053,500	45,165,000	123,700
1946	761,598,000	2,086,600	722,923,000	1,980,600	38,675,000	106,000
1947	857,283,000	2,348,700	816,783,000	2,237,800	40,500,000	110,900
1948	875,154,000	2,391,200	840,807,000	2,297,300	34,347,000	93,900
1949	843,126,000	2,309,900	818,000,000	2,241,100	25,126,000	68,800
1950 Est.	873,000,000	2,391,700	854,000,000	2,339,700	19,000,000	52,000

* Breakdown of fuel oils by distillates and residual grades not available prior to 1932: but breakdown for 1932 and subsequent years appears at right.

YEAR	TOTAL DEMAND (Domestic and Export) Annual Total	TOTAL DEMAND (Domestic and Export) Daily Average	DOMESTIC DEMAND Annual Total	DOMESTIC DEMAND Daily Average	EXPORTS Annual Total	EXPORTS Daily Average
Distillate Fuel Oil						
1932	73,883,000	201,900	65,101,000	177,900	8,782,000	24,000
1933	76,172,000	208,700	64,748,000	177,400	11,424,000	31 300
1934	89,330,000	244,700	74,824,000	205,000	14,506,000	39,700
1935	102,277,000	280,200	86,028,000	235,700	16,249,000	44,500
1936	123,205,000	336,600	102,757,000	280,800	20,448,000	55,800
1937	146,970,000	402,600	116,841,000	320,100	30,129,000	82,500
1938	147,090,000	403,000	117,449,000	321,800	29,641,000	81,200
1939	166,993,000	457,500	134,973,000	369,800	32,020,000	87,700
1940	179,991,000	491,800	160,851,000	439,500	19,140,000	52,300
1941	189,749,000	519,900	172,824,000	473,500	16,925,000	46,400
1942	207,236,000	567,700	185,661,000	508,600	21,575,000	59,100
1943	233,067,000	638,600	208,110,000	570,200	24,957,000	68,400
1944	252,811,000	690,700	209,320,000	571,900	43,491,000	118,800
1945	259,580,000	711,100	226,084,000	619,400	33,496,000	91,700
1946	272,381,000	746,300	242,894,000	665,500	29,487,000	80,800
1947	328,150,000	899,000	298,273,000	817,200	29,877,000	81,800
1948	361,856,000	988,700	340,048,000	929,100	21,808,000	59,600
1949	338,792,000	928,200	326,284,000	893,900	12,508,000	34,300
1950 Est.	376,000,000	1,030,100	367,000,000	1,005,500	9,000,000	24,600
Residual Fuel Oil						
1932	250,268,000	683,800	239,056,000	653,200	11,212,000	30,600
1933	268,096,000	734,500	258,957,000	709,500	9,139,000	25,000
1934	279,646,000	766,100	265,547,000	727,500	14,099,000	38,600
1935	293,394,000	803,800	280,695,000	769,000	12,699,000	34,800
1936	322,319,000	880,700	307,884,000	841,200	14,435,000	39,500
1937	340,818,000	933,700	325,514,000	891,800	15,304,000	41,900
1938	309,753,000	848,600	291,833,000	799,500	17,920,000	49,100
1939	340,973,000	934,200	323,488,000	886,300	17,485,000	47,900
1940	356,272,000	973,400	340,163,000	929,400	16,109,000	44,000
1941	397,536,000	1,089,100	383,422,000	1,050,400	14,114,000	38,700
1942	417,792,000	1,144,600	405,697,000	1,111,500	12,095,000	33,100
1943	481,902,000	1,320,300	467,008,000	1,279,500	14,894,000	40,800
1944	524,556,000	1,433,200	512,020,000	1,399,000	12,536,000	34,200
1945	535,092,000	1,466,000	523,423,000	1,434,000	11,669,000	32,000
1946	489,217,000	1,340,300	480,029,000	1,315,100	9,188,000	25,200
1947	529,133,000	1,449,700	518,510,000	1,420,600	10,623,000	29,100
1948	513,298,000	1,402,500	500,759,000	1,368,200	12,539,000	34,300
1949	504,334,000	1,381,700	491,716,000	1,347,200	12,618,000	34,500
1950 Est.	497,000,000	1,361,600	487,000,000	1,334,200	10,000,000	27,400

Source: U. S. Bureau of Mines except for 1949 which has been estimated by WORLD OIL with aid of Bureau statistics for 10 months.

the importance of PROFICIENCY



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but since steam locomotives are being replaced by diesels, the consumption of diesel oil by railroads has increased sharply. Partially offsetting the reduction in residual fuel oil use by the railroads has been an increase in consumption of that product by other industries, as many public utility electric plants and industrial users have been shifting from coal to oil as fuel.

In spite of the anticipated further declines in exports in 1950, the major refined products are expected to be in greater total demand than in 1949, due to more or less normal growth of domestic requirements, though residual fuel oil may show a small decrease.

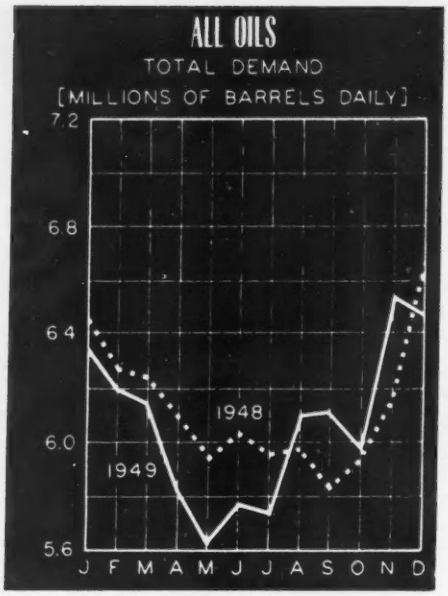
Motor fuel total demand is expected to average about 2,688,000 barrels daily in 1950, a new all-time record and an increase of 4.1 percent over the 2,583,000 daily of 1949. The record demand of 1949 was 3.7 percent above that in 1948. Domestic demand for motor fuel is expected to increase 5.5 percent in 1950 after rising 3.6 percent in 1949.

Kerosine total demand is expected to be 8.4 percent higher in 1950 than in 1949 but not quite back up to the 1948 level. Domestic demand for kerosine was inflated in the winter of 1947-48 due to scarcity of light grades of distillate fuel oil; and consumption declined sharply in 1949, due to ample distillate and also because of milder than normal weather in the first and fourth quarters. However, recent figures seem to indicate a continued normal expansion for use as range oil and for small space heating.

Total demand for distillate fuel oil is estimated as increasing about 11 percent in 1950, to a new all-time peak, following a decline of 6.4 percent in 1949; with domestic demand to be up about 12.5 percent to a new high, after dropping 4 percent in 1949. About half of the projected gain in domestic demand in 1950 is based on the expectation of more normal weather and the other half on the increases that have occurred in the number of oil burner installations.

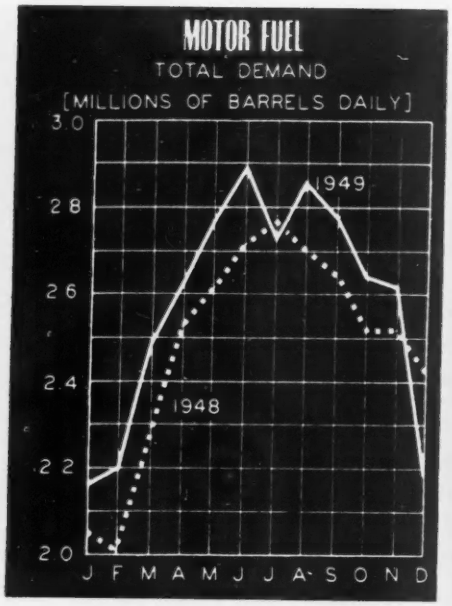
Residual fuel oil total demand is expected to decline about 1.5 percent in 1950, following a 1.7 percent decrease in 1949, with domestic consumption off about 1 percent in 1950, after a 1.5 percent drop in 1949. It is conceded, however, that the downward trend in domestic demand for residual for railroad and vessel uses might be counteracted by conversions from coal to oil in industrial plants. Residual exports are estimated at 28,000 barrels daily in 1950, compared with 35,000 in 1949 and 34,000 in 1948.

(See Table on Page 39)



Barrels Daily Demand, All Oils

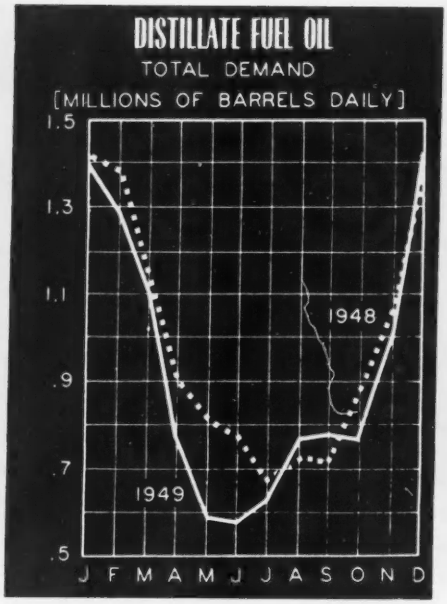
MONTH	1949	1948
January	6,339,000	6,444,000
February	6,199,000	6,269,000
March	6,141,000	6,234,000
April	5,822,000	6,098,000
May	5,612,000	5,927,000
June	5,778,000	6,043,000
July	5,737,000	5,965,000
August	6,163,000	5,987,000
September	6,170,000	5,837,000
October	5,979,000	5,943,000
November	6,533,000	6,175,000
December	6,490,000	6,626,000



Barrels Daily Demand, Motor Fuel

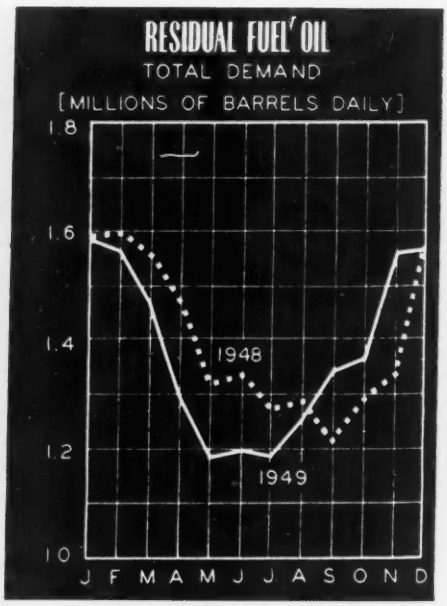
MONTH	1949	1948
January	2,164,000	2,053,000
February	2,200,000	2,008,000
March	2,495,000	2,283,000
April	2,637,000	2,528,000
May	2,769,000	2,608,000
June	2,896,000	2,714,000
July	2,726,000	2,767,000
August	2,860,000	2,700,000
September	2,779,000	2,649,000
October	2,649,000	2,519,000
November	2,618,000	2,516,000
December	2,182,000	2,433,000

Source for Data on this Page: U. S. Bureau of Mines, except November and December, 1949, estimated.



Barrels Daily Demand, Distillate Fuel

MONTH	1949	1948
January	1,392,000	1,419,000
February	1,291,000	1,379,000
March	1,102,000	1,147,000
April	777,000	914,000
May	595,000	815,000
June	579,000	772,000
July	628,000	670,000
August	770,000	722,000
September	777,000	725,000
October	773,000	875,000
November	1,055,000	1,066,000
December	1,415,000	1,371,000



Barrels Daily Demand, Residual Fuel

MONTH	1949	1948
January	1,585,000	1,590,000
February	1,568,000	1,595,000
March	1,469,000	1,567,000
April	1,299,000	1,471,000
May	1,183,000	1,314,000
June	1,198,000	1,339,000
July	1,189,000	1,275,000
August	1,261,000	1,286,000
September	1,346,000	1,208,000
October	1,365,000	1,295,000
November	1,553,000	1,334,000
December	1,579,000	1,560,000

Demand for and Supply of All Oils, Crude Oil, Motor Fuel, Kerosine, Fuel Oil, and Lubricants

Sources: U. S. Bureau of Mines except November and December, 1949, estimated with aid of A.P.I. reports

(THOUSANDS OF BARRELS)

ITEM	Year 1948	Year 1949	Percent Diff.
ALL OILS			
Domestic Production, Total	2,162,119	1,996,036	— 7.7
(Daily Average)	5,907	5,468	— 7.4
Crude Petroleum	2,016,282	1,839,615	— 8.8
(Daily Average)	5,509	5,040	— 8.5
Natural Gasoline	145,479	156,232	+ 7.4
(Daily Average)	397	428	+ 7.8
Benzol	358	189	— 47.2
(Daily Average)	1	.....	.....
Imports, Total	187,709	232,159	+ 23.7
(Daily Average)	513	636	+ 24.0
Crude Petroleum	129,093	154,442	+ 19.6
(Daily Average)	353	423	+ 19.8
Refined Products	58,616	77,717	+ 32.6
(Daily Average)	160	213	+ 33.1
Changes in Stocks, All Oils	+106,502	+ 8,871	.....
(Daily Average)	+291	+24	.....
Stocks, Beginning of Period	500,800	605,189	+ 20.8
Crude Petroleum	230,654	256,254	+ 11.1
Refined Products	*265,850	†343,356	+ 29.9
Natural Gasoline	4,296	5,579	+ 29.9
Stocks, End of Period	607,302	614,060	+ 1.1
(Days' Supply)	99	101	+ 2.0
Crude Petroleum	256,254	254,449	— 0.7
Refined Products	*345,469	†352,511	+ 2.7
Natural Gasoline	5,579	7,100	+ 27.3
Demand, Total	2,243,326	2,219,324	— 1.1
(Daily Average)	6,129	6,080	— 0.8
Exports, Total	134,954	120,259	— 10.9
(Daily Average)	369	329	— 10.8
Crude Petroleum, Total	39,840	33,247	— 16.5
(Daily Average)	109	91	— 16.5
Refined Products, Total	95,114	87,012	— 8.5
(Daily Average)	260	238	— 8.5
Domestic Demand, Total	2,108,372	2,099,065	— 0.4
(Daily Average)	5,760	5,751	— 0.2
CRUDE PETROLEUM			
Supply:			
Domestic Production, Total	2,016,282	1,839,615	— 8.8
(Daily Average)	5,509	5,040	— 8.5
Imports, Total	129,093	154,442	+ 19.6
(Daily Average)	353	423	+ 19.8
Change in Stocks	+25,600	— 1,805	.....
(Daily Average)	+70	—5	.....
Stocks, Beginning of Period	230,654	256,254	+ 11.1
Stocks, End of Period	256,254	254,449	— 0.7
(Days' Supply)	44	47	+ 6.8
Supply, Total	2,119,775	1,995,862	— 5.8
(Daily Average)	5,792	5,468	— 5.6
Demand:			
Runs to Stills, Total	2,030,670	1,943,254	— 4.3
(Daily Average)	5,548	5,324	— 4.0
Domestic Crude	1,906,656	1,787,042	— 6.3
(Daily Average)	5,209	4,896	— 6.0
Foreign Crude	124,014	156,212	+ 26.0
(Daily Average)	339	428	+ 26.3
Exports, Total	39,840	33,247	— 16.5
(Daily Average)	109	91	— 16.5
Transfers to Fuel Oil Stocks	*27,390	† 7,500	.....
(Daily Average)	75	21	.....
Distillate Fuel Oil	3,543	2,678	— 24.4
Residual Fuel Oil	*23,847	†4,822	.....
Used as Fuel, and Losses	21,875	11,861	— 45.8
(Daily Average)	60	32	— 46.7
Demand, Total	2,119,775	1,995,862	— 5.8
(Daily Average)	5,792	5,468	— 5.6
KEROSINE			
Production, Total	121,853	102,133	— 16 2
(Daily Average)	333	280	— 15.9
Percent Yield from Crude	6.0	5.2	.....
Imports, Total	135	.....	—100.0
(Daily Average)	.....	.....	—100.0
Change in Stocks	+6,288	— 3,057	.....
(Daily Average)	+17	—8	.....
Stocks, Beginning of Period	*17,607	†23,895	+ 36.4
Stocks, End of Period	*24,010	†20,838	— 13.2
(Days' Supply)	76	72	— 5.3
Demand, Total	115,700	105,190	— 9.1
(Daily Average)	316	288	— 8.9
Exports, Total	3,535	2,526	— 28.5
(Daily Average)	10	7	— 30.0
Domestic Demand	112,165	102,664	— 8.5
(Daily Average)	306	281	— 8.2

ITEM	Year 1948	Year 1949	Percent Diff.
MOTOR FUEL			
Production, Total	921,902	953,961	+ 3.5
(Daily Average)	2,519	2,614	+ 3.8
Refinery Gasoline, Total	819,676	845,252	+ 3.1
(Daily Average)	2,240	2,316	+ 3.4
Percent Yield from Crude	40.3	43.4	.....
Natural Gasoline, etc	145,479	156,232	+ 7.4
(Daily Average)	397	428	+ 7.8
Less Sales of L.P.G.	41,697	45,298	+ 8.6
Less Transfers Cycle Prods	1,914	2,414	+ 26.1
Benzol	358	189	— 47.2
Imports, Total	302	.....	—100.0
(Daily Average)	1	.....	—100.0
Change in Stocks	+13,594	+11,285	.....
(Daily Average)	+37	+31	.....
Stocks, Beginning of Period	87,407	101,001	+ 15.6
Finished Gasoline	83,111	95,422	+ 14.8
Natural Gasoline	4,296	5,579	+ 29.9
Stocks, End of Period	101,001	112,286	+ 11.2
(Days' Supply)	41	44	+ 7.3
Finished Gasoline	95,422	105,186	+ 10.2
Natural Gasoline	5,579	7,100	+ 27.3
Demand, Total	908,610	942,676	+ 3.7
(Daily Average)	2,483	2,583	+ 4.0
Exports, Total	37,410	40,115	+ 7.2
(Daily Average)	102	110	+ 7.8
Domestic Demand	871,200	902,561	+ 3.6
(Daily Average)	2,381	2,473	+ 3.9
DISTILLATE FUEL OIL			
Production, Total	380,639	340,726	— 10.5
(Daily Average)	1,040	934	— 10.2
Percent Yield from Crude	18.7	17.5	.....
Transfers from Crude	3,543	2,678	— 24.4
(Daily Average)	10	7	— 30.0
Imports, Total	2,546	1,808	— 29.0
(Daily Average)	7	5	— 28.6
Change in Stocks	+24,872	+6,420	.....
(Daily Average)	+68	+18	.....
Stocks, Beginning of Period	*51,081	†71,381	+ 48.7
Stocks, End of Period	*75,953	†77,801	+ 9.0
(Days' Supply)	77	84	+ 9.1
Demand, Total	361,856	338,792	— 6.4
(Daily Average)	989	928	— 6.2
Exports, Total	21,808	12,508	— 42.7
(Daily Average)	60	34	— 43.3
Domestic Demand	340,048	326,284	— 4.0
(Daily Average)	929	894	— 3.8
RESIDUAL FUEL OIL			
Production, Total	466,141	424,094	— 9.0
(Daily Average)	1,274	1,162	— 8.8
Percent Yield from Crude	23.0	21.8	.....
Transfers from Crude	*23,847	† 4,822	.....
(Daily Average)	65	13	.....
Imports, Total	53,161	73,100	+ 37.5
(Daily Average)	145	200	+ 37.9
Change in Stocks	+29,851	—2,318	.....
(Daily Average)	+82	—7	.....
Stocks, Beginning of Period	*47,091	†63,993	+ 63.4
Stocks, End of Period	*76,942	†61,675	— 3.6
(Days' Supply)	55	45	— 18.2
Demand, Total	513,298	504,334	— 1.7
(Daily Average)	1,402	1,382	— 1.4
Exports, Total	12,539	12,618	+ 0.6
(Daily Average)	34	35	+ 2.9
Domestic Demand	500,759	491,716	— 1.8
(Daily Average)	1,368	1,347	— 1.5
LUBRICANTS			
Production, Total	51,416	45,134	— 12.2
(Daily Average)	140	124	— 11.4
Percent Yield from Crude	2.5	2.3	.....
Imports, Total	101	.....	—100.0
(Daily Average)	.....	.....	—100.0
Change in Stocks	+2,142	—543	.....
(Daily Average)	+6	—1	.....
Stocks, Beginning of Period	7,701	9,843	+ 27.8
Stocks, End of Period	9,843	9,300	— 5.5
(Days' Supply)	73	74	+ 1.4
Demand, Total	49,375	45,677	— 7.5
(Daily Average)	134	125	— 6.7
Exports, Total	12,990	12,662	— 2.5
(Daily Average)	35	35	.....
Domestic Demand	36,385	33,015	— 9.3
(Daily Average)	99	90	— 9.1

* Old Basis. † New Basis

U. S. Becomes Larger Net Importer in

FOREIGN OIL TRADE

FOREIGN markets for U. S. petroleum continued to decline during 1949, and at the same time oil produced in other countries supplied a larger portion of the American domestic market. Consequently, the U. S. became a much larger net importer of petroleum during the past year as imports swelled to new highs and exports declined sharply. All signs indicate a continuation of these trends in 1950, with imports due to be at another all-time peak and exports expected to drop to the lowest level since 1922.

Imports of crude and refined products exceeded exports by 306,500 barrels daily in 1949, whereas the difference in the preceding year had been but 145,000 barrels per day, or only half as much. A net importer is a relatively new position for the country, as exports regularly exceeded imports in the years 1923 through 1947. Even in 1946 and 1947, when imports increased sharply in reflection of difficulties encountered in supplying demand from domestic sources, exports still were slightly in excess of import volumes. For the first time since the shortage period which followed World War I, the U. S. imported more oil than it exported in 1948. Indications are that in 1950 U. S. imports will exceed exports by at least 435,000 barrels daily, perhaps more.

During 1949, total U. S. imports were at an all-time record, averaging 636,000 barrels daily. This was a gain of 121,700 barrels, or 24 percent, over the daily average of 514,300 barrels imported in the preceding year. Movement of this enlarged volume of foreign oil into the country boosted imports to twice the 1945 rate. Daily imports the past year consisted of 423,100 barrels of crude and 212,900 barrels of refined products. Crude shipments represented a gain of 69,400 barrels and refined products were up 52,300 barrels from 1948 rates.

Meanwhile, export shipments from the country were declining. They totaled but 329,500 barrels daily the past year compared with 368,700 barrels in 1948 and an all-time high of 567,200 barrels per day in 1944. Since 1926 U. S. exports have been below the 1949 rate only during three of the depression years.

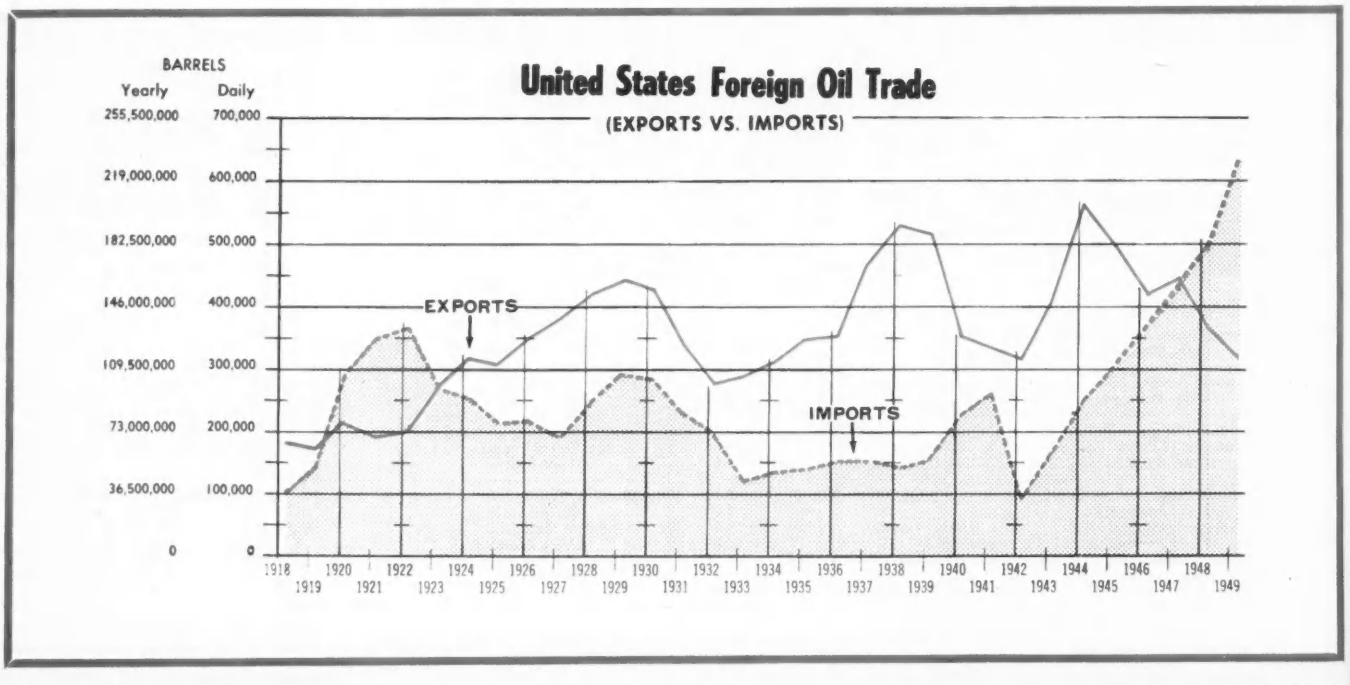
Total U. S. imports of all oils in 1950 are conservatively estimated at 704,100 barrels per day by the U. S. Bureau of Mines, which would be 68,100 barrels more than 1949 volumes. This estimate includes allowance for 474,000 barrels of crude oil, compared with 423,100 barrels in 1949; and 230,100 barrels of refined products in comparison with 212,900 barrels during the past year.

Many foresee the importation of larger volumes than the foregoing figures. Importing rates during last December reached 750,000 barrels daily. Furthermore, recently announced reduction in plans of leading importers still indicates the delivery of about 750,000 barrels per day of foreign oil to this country during the first half of 1950.

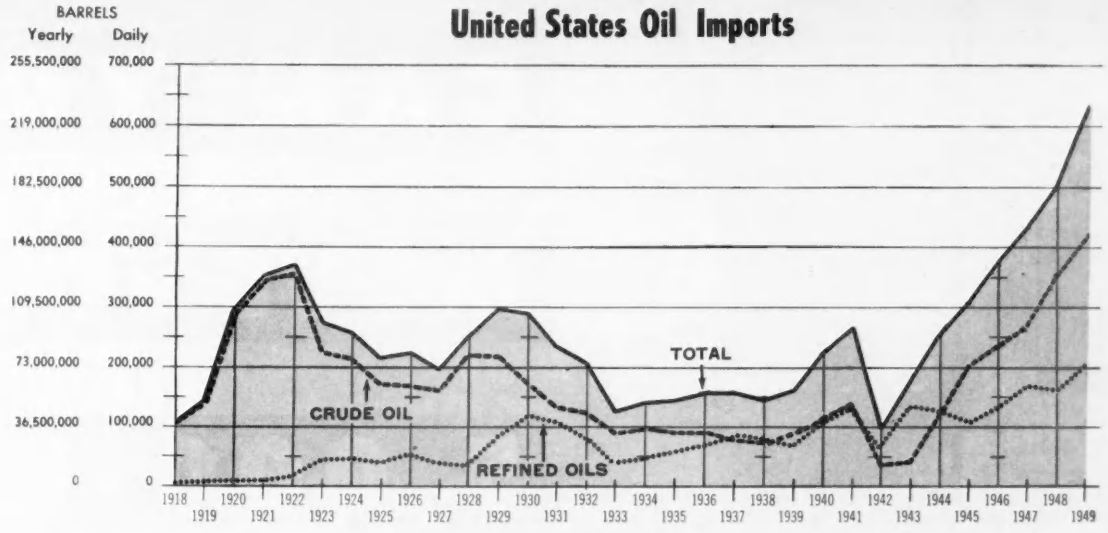
Because of additional growth in foreign production and the lack of dollar currency to buy American products, exports in 1950 are not likely to exceed 268,500 barrels daily. This would constitute a decline of 61,000 barrels from the 1949 level, and reduce exports to the lowest volume since 1922.

If imports do not exceed 704,000 barrels daily and exports total 268,500 barrels, the U. S. will be a net importer in 1950 by 435,500 barrels per day as compared with 306,500 barrels the past year.

Rapid growth of imports and simultaneous shrinkage of exports has had a retarding influence on U. S. crude production. Daily petroleum consumption of the country in 1949 was nearly 50,000 barrels less than in the preceding year, primarily because exports were off by 39,300 barrels.



United States Oil Imports

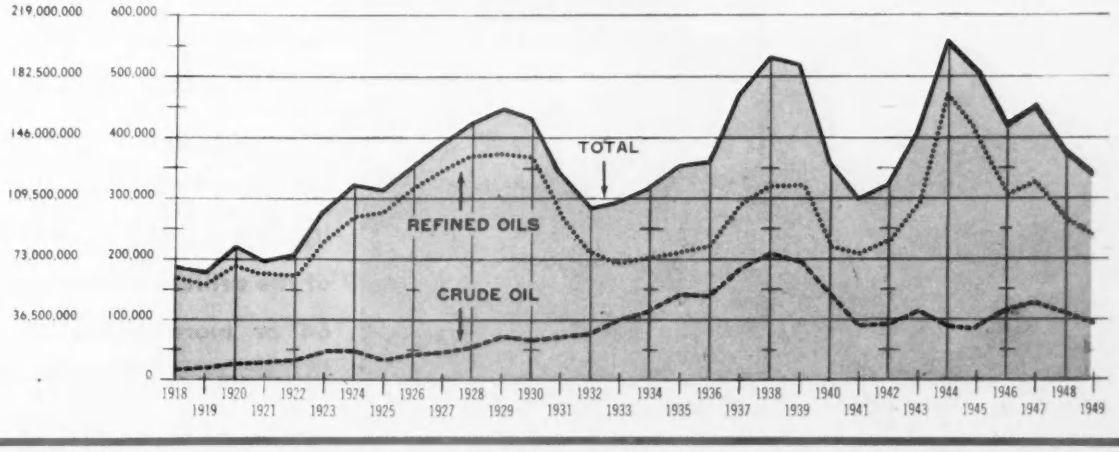


(All Figures in Barrels)

	IMPORTS						EXPORTS					
	CRUDE OIL		REFINED PRODUCTS		TOTAL IMPORTS		CRUDE OIL		REFINED PRODUCTS		TOTAL EXPORTS	
YEAR	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1918.....	37,736,000	103,400	1,227,000	3,400	38,963,000	106,800	5,884,000	16,100	62,234,000	170,500	68,118,000	186,600
1919.....	52,822,000	144,700	1,376,000	3,800	54,198,000	148,500	6,348,000	17,400	57,545,000	157,600	63,893,000	175,100
1920.....	106,175,000	290,100	2,647,000	7,200	108,822,000	297,300	9,295,000	25,400	70,323,000	192,100	79,618,000	217,500
1921.....	125,364,000	343,500	3,428,000	9,400	128,792,000	352,900	9,527,000	26,400	62,254,000	170,500	71,881,000	196,900
1922.....	130,255,000	356,800	5,719,000	15,700	135,974,000	372,500	10,805,000	29,600	63,745,000	174,600	74,550,000	204,200
1923.....	82,015,000	224,700	17,638,000	48,300	99,653,000	273,000	17,534,000	48,000	84,800,000	232,300	102,334,000	280,300
1924.....	77,775,000	212,500	16,806,000	45,900	94,581,000	258,400	18,239,000	49,800	99,089,000	270,700	117,328,000	320,500
1925.....	61,824,000	169,400	16,376,000	44,900	78,200,000	214,300	13,337,000	36,500	100,684,000	275,900	114,021,000	312,400
1926.....	60,382,000	165,400	20,938,000	57,400	81,320,000	222,800	15,407,000	42,200	116,999,000	320,600	132,406,000	362,800
1927.....	58,383,000	159,900	13,353,000	36,600	71,736,000	196,500	15,844,000	43,400	126,419,000	346,400	142,263,000	389,800
1928.....	79,767,000	218,000	11,790,000	32,200	91,557,000	250,200	18,966,000	51,800	135,991,000	371,600	154,957,000	423,400
1929.....	78,933,000	216,200	29,777,000	81,600	108,710,000	297,800	26,401,000	72,300	136,719,000	374,600	163,120,000	446,900
1930.....	62,129,000	170,200	43,489,000	119,200	105,618,000	289,400	23,705,000	64,900	132,790,000	363,800	156,495,000	428,700
1931.....	47,250,000	129,500	38,837,000	106,400	86,087,000	235,900	25,535,000	70,000	98,819,000	270,700	124,354,000	340,700
1932.....	44,682,000	122,100	29,812,000	81,400	74,494,000	203,500	27,393,000	74,900	75,882,000	207,300	103,275,000	282,200
1933.....	31,893,000	87,400	13,501,000	37,000	45,394,000	124,400	36,584,000	100,200	70,143,000	192,200	106,727,000	292,400
1934.....	35,558,000	97,400	14,936,000	40,900	50,494,000	138,300	41,127,000	112,700	73,380,000	201,000	114,507,000	313,700
1935.....	32,239,000	88,300	20,396,000	55,900	52,635,000	144,200	51,430,000	140,900	77,557,000	212,500	128,987,000	353,400
1936.....	32,327,000	88,300	24,777,000	67,700	57,104,000	156,000	50,313,000	137,400	81,681,000	223,300	131,994,000	360,600
1937.....	27,484,000	75,300	29,673,000	81,300	57,157,000	156,600	67,234,000	184,200	105,600,000	289,300	172,834,000	473,500
1938.....	26,412,000	72,400	27,896,000	76,400	54,308,000	148,800	77,254,000	211,700	116,474,000	319,100	193,728,000	530,800
1939.....	33,095,000	90,700	25,965,000	71,100	59,060,000	161,800	72,076,000	197,500	116,883,000	320,200	188,959,000	517,700
1940.....	42,662,000	116,600	41,089,000	112,200	83,751,000	228,800	51,496,000	140,700	78,970,000	215,800	130,466,000	356,500
1941.....	50,606,000	138,700	46,536,000	127,500	97,142,000	266,200	33,238,000	91,100	75,592,000	207,100	108,830,000	298,200
1942.....	12,297,000	33,700	23,669,000	64,800	35,966,000	98,500	33,834,000	92,700	83,073,000	227,600	116,907,000	320,300
1943.....	13,833,000	37,900	49,579,000	135,800	63,412,000	173,700	41,342,000	113,200	108,615,000	297,600	149,957,000	410,800
1944.....	44,805,000	122,400	47,506,000	129,800	92,311,000	252,200	34,238,000	93,500	173,378,000	473,700	207,616,000	567,200
1945.....	74,337,000	203,600	39,282,000	107,600	113,619,000	311,200	32,998,000	90,400	149,985,000	410,900	182,983,000	501,300
1946.....	86,066,000	235,800	51,610,000	141,400	137,676,000	377,200	42,436,000	116,300	110,687,000	303,200	153,123,000	419,500
1947.....	97,532,000	267,200	61,857,000	169,500	159,389,000	436,700	46,355,000	127,000	118,122,000	323,600	164,477,000	450,600
1948.....	129,093,000	353,700	58,616,000	160,600	187,709,000	514,300	39,840,000	108,800	95,114,000	259,900	134,954,000	368,700
1949.....	154,442,000	423,100	77,717,000	212,900	232,159,000	636,000	33,247,000	91,000	87,012,000	238,400	120,259,000	329,500
1950 Est...	173,000,000	474,000	84,000,000	230,100	257,000,000	704,100	28,000,000	76,700	70,000,000	191,800	98,000,000	268,500

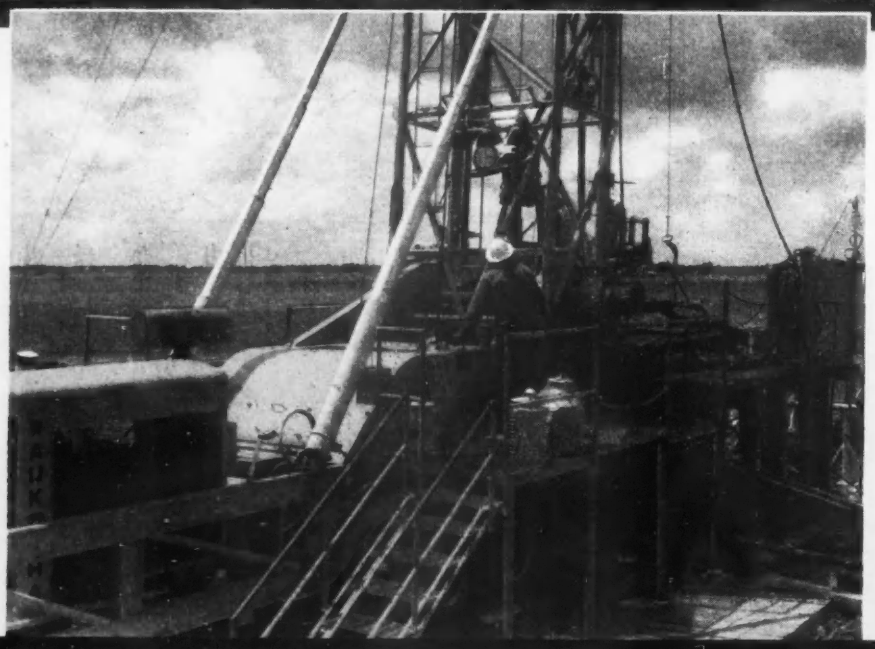
Source: U. S. Bureau of Mines, except 1949 includes estimates for November and December

United States Oil Exports



CAN YOU MOVE YOUR 5,000-FT. RIG FOR $303.59?

The Trailerig is a complete double drum draw works with a 90-foot mast, for drilling to 5,000 feet with 4½-inch pipe or workover jobs to 10,000 feet.



The Trailerig is arranged for maximum operating convenience. Driller's position at the centralized air controls provides excellent visibility. The cathead is placed in front of the driller for maximum safety. 64 or more inches of wellhead clearance is provided under the rotary table without the use of bulky, hard-to-move ramps.

Invoice

DON W TRUCK LINE
OIL FIELD HAULING

DAY PHONE 1948
PORT LAVACA HIGHWAY ⁘ P. O. BOX 711 NIGHT PHONE 2237-J
VICTORIA, TEXAS

OUR INVOICE NO. Nº 2914

DATE Sept. 24, 1949
STATE-WIDE R. R. C. NO. 5600
I. C. C. PERMIT NO. MC-85652
YOUR ORDER NO.
LEASE Welder-Mecom
THIS WORK ORDERED BY YOUR MR.

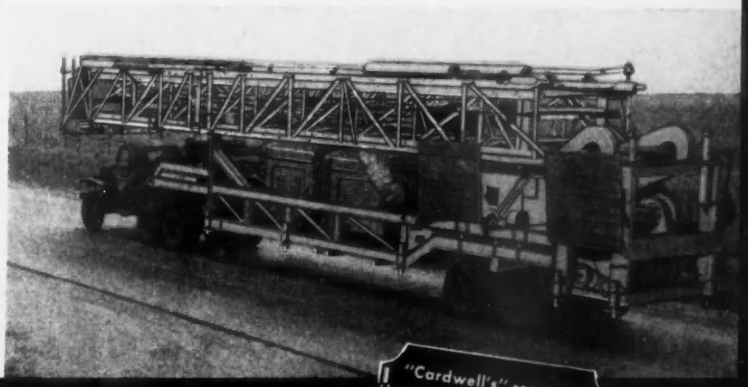
Big Six Drilling Co.,
214 Oil & Gas Bldg.,
Houston, Texas.

DATE	DESCRIPTION	HOURS	RATE	AMOUNT
9/20-21/49	Tear Down, move and set-up your Rig from Welder-Mecom #1 to Welder-Mecom #2. Pull water well and haul tool from your rig at Bloomington, to your rig Welder-Mecom #2 and haul tools from your rig to D& W Tool Co. in Victoria.			
	One 20 Ton Tandem W/ Driver & Helper	5	16.25	81.25
	One 8-10 Ton Truck W/ Driver & Helper	3	10.75	32.25
	Two 2½ Ton trucks W/ Drivers & Helpers	29	6.25	181.25
	3% Federal Tax			8.84
				303.59

BIG 6 DID!!

This "Cardwell" 5,000-foot Trailerig, owned by Big 6 Drilling Company, has been making records for low-cost, quick moves in the Gulf Coast. The invoice above covers the total paid-out expense for a typical five-mile move. . . . Low-cost moving combined with fast rig-up time cut costs to the "bone," and keep the Trailerig making hole more days per month. Other Trailerig owners in the United States, Canada and foreign fields are reporting huge savings in moving costs. This high performance "Cardwell" Trailerig can cut your moving costs to a minimum. Ask your "Cardwell" representative where you can see a Trailerig at work.

Moving is simple. The Trailerig is only 8 feet wide, 13½ feet high, and can be easily moved with a fifth-wheel type truck.



"Cardwell's" reputation in all fields for building "Tough Iron" comes from the use of Alloy steels and heat-treatment. This "know how" cannot be copied.

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THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

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PETROLEUM PRICES

Stable After Drop from Postwar Peaks

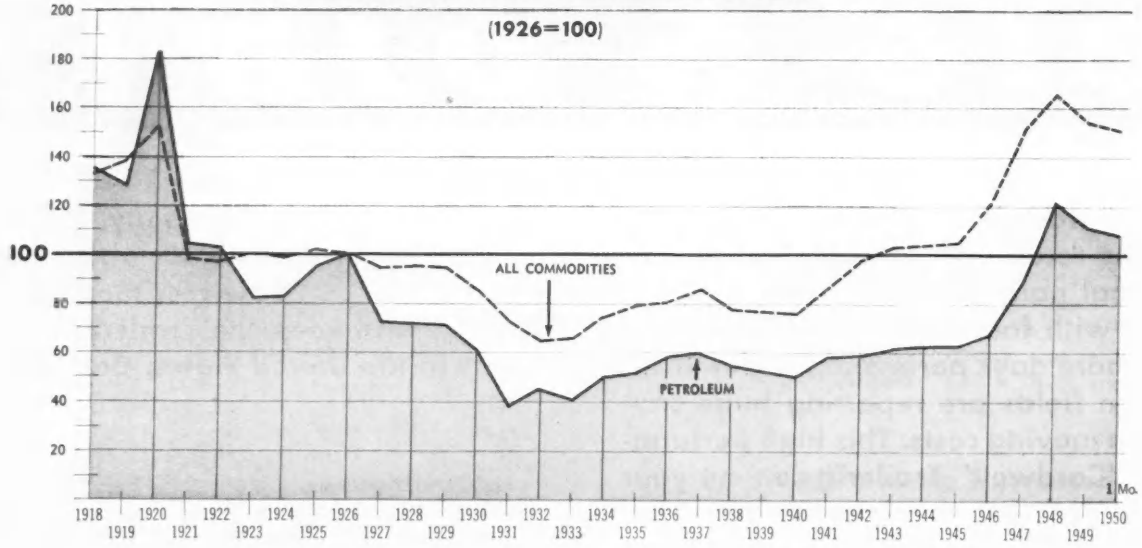
FOLLOWING downward adjustments in 1949 in prices of heavy crudes, residual fuel oil, and heating oils, petroleum industry prices appear fairly stable in early 1950. Petroleum prices, like commodity prices in general, have moderately but definitely declined from postwar peaks, and henceforth seem to have only two ways to go, either sidewise along established levels or toward lower levels.

Currently, petroleum industry prices are not generally under any great downward pressure, and there is a possibility they may hold fairly well to present levels through the year. However, there are a few unfavorable conditions, including especially the large and increasing stocks of gasoline, which could result in moderate reductions in 1950 in prices of crude as well as products.

Drastic curtailment of crude production in 1949 prevented accumulation of surpluses of crude in storage, and with supplies well balanced with demand, crude markets have held remarkably steady, even in the face of 1949's general business letdown and softening of fuel oil prices. Only the heavier crudes and some special crudes, including Pennsylvania grade, have been in sufficiently serious oversupply to be forced down in price from the postwar peaks of 1948. Sustained by strong demand and steady prices for gasoline, lighter crudes have not been in oversupply, and prices have not declined. The national weighted average price of crude in early 1950 is about $2.52 per barrel, compared with $2.54 in 1949 and a postwar peak of $2.57 in 1948.

At present the most serious threat to the crude price structure is that offered by the large and still increasing stocks of gasoline. In the week ended February 4, U. S. stocks of finished and unfinished gasoline totaled 127,437,000 barrels. That was approximately 10 million barrels more than stocks held one year previously and almost as much as the peak of 128,087,000 barrels reached last spring, in the week ended March 26. If coming weeks should bring continuance of the recent trend, 10 million barrels above a year ago, gasoline stocks at the end of March, would be around 138 million barrels. In the opinion of some petroleum economists, that would be at least several million barrels more than justified and might cause serious softening of gasoline prices, which in turn could force reduction of crude oil prices, since a favorable

Wholesale Price Indices
All Commodities Vs. Petroleum Products



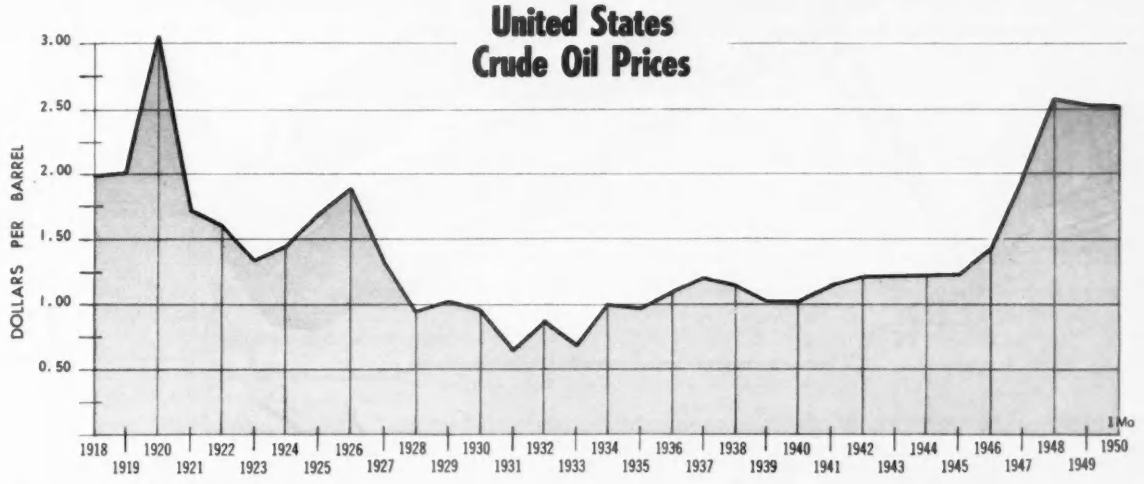
YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum	YEAR	All Commodities	Petroleum
1918.....	131.3	135.3	1925.....	103.5	95.0	1932.....	64.8	45.4	1939.....	77.1	52.2	1946.....	121.1	67.5
1919.....	138.6	128.0	1926.....	100.0	100.0	1933.....	65.9	41.0	1940.....	78.6	50.0	1947.....	152.1	89.3
1920.....	154.4	183.5	1927.....	95.4	72.7	1934.....	74.9	50.5	1941.....	87.3	57.0	1948.....	165.0	122.0
1921.....	97.6	104.4	1928.....	96.7	72.0	1935.....	80.0	51.3	1942.....	98.8	59.8	1949.....	154.9	112.2
1922.....	96.7	102.9	1929.....	95.3	71.3	1936.....	80.8	57.3	1943.....	103.2	62.5	1950 (Jan.).	150.9	108.0
1923.....	100.6	82.6	1930.....	86.4	61.5	1937.....	86.3	60.5	1944.....	104.0	63.9			
1924.....	98.1	83.5	1931.....	73.0	39.5	1938.....	78.6	55.9	1945.....	105.8	63.5			

gasoline market has been a principal support for the crude price structure.

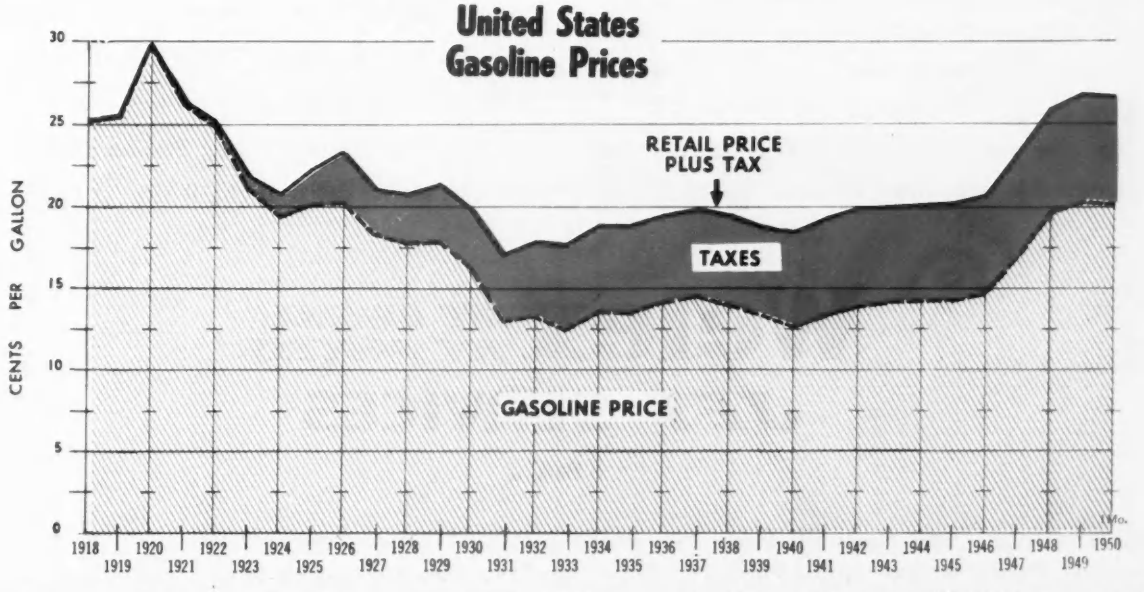
It is conceded that some increase in gasoline stocks over a year ago is justified, as gasoline demand is expected to be from 4 to 5 percent greater in 1950 than in 1949, and an increase of 5 percent in stocks would put them at about 134 or 135 million barrels at the end of March. While end-of-March gasoline stocks of 135 million barrels may be thus justified, the prospective actual stocks of 138 to 140 million barrels would include a substantial surplus that could seriously weaken the gasoline market. This would endanger the crude oil market. Gasoline is the industry's only major refined product offering attractive profit margins, and if gasoline prices should decline, it is doubtful if refiners could continue buying crude at present prices.

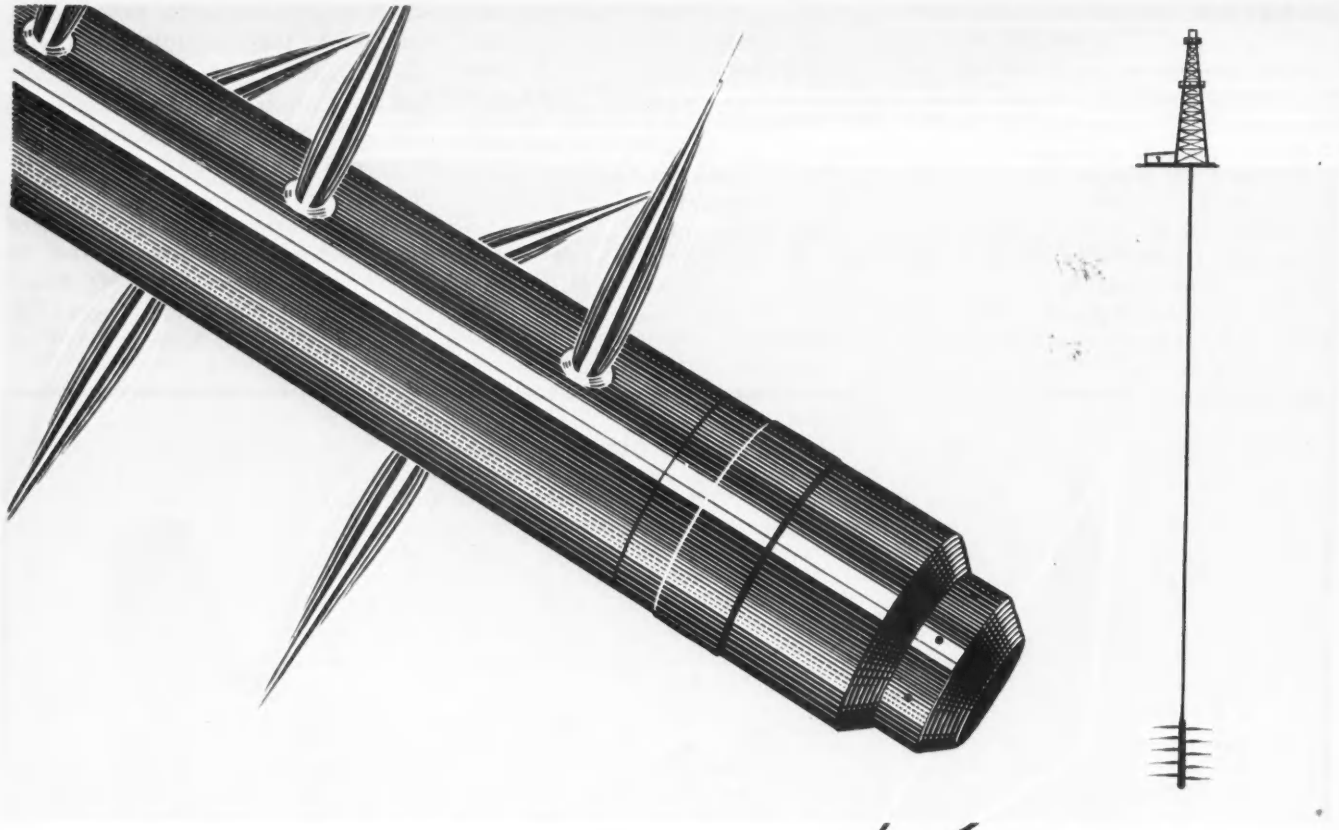
Crude prices reached their postwar peaks late in 1947, and stayed at those peak levels throughout 1948, the only exception having been a cut in Pennsylvania grade from its peak of $5 per barrel to a maximum of $4.50 on December 11, 1948. In 1949 there were numerous changes, nearly all reductions, but they affected mostly Pennsylvania grade and heavy crudes, as markets for lubricants and fuel oils showed protracted weakness.

Pennsylvania grade was cut several times and Bradford-Allegany crude hit a low of $3.27 in May, 1949, lowest since wartime price-control years. This crude recovered to $3.40 June 16 and



YEAR	CRUDE OIL DOLLARS PER BARREL	GASOLINE CENTS PER GALLON			YEAR	CRUDE OIL DOLLARS PER BARREL	GASOLINE CENTS PER GALLON			YEAR	CRUDE OIL DOLLARS PER BARREL	GASOLINE CENTS PER GALLON		
		50 Cities Average					50 Cities Average					50 Cities Average		
	At Wells	Without Tax	Tax	With Tax		At Wells	Without Tax	Tax	With Tax		At Wells	Without Tax	Tax	With Tax
1918...	1.98	25.12	0.00	25.12	1929...	1.27	17.92	3.50	21.42	1940...	1.02	12.75	5.66	18.41
1919...	2.01	25.41	0.06	25.47	1930...	1.19	16.17	3.78	19.95	1941...	1.14	13.30	5.93	19.23
1920...	3.07	29.74	0.09	29.83	1931...	.65	12.98	4.00	16.98	1942...	1.19	13.96	5.97	19.93
1921...	1.73	26.11	0.20	26.31	1932...	.87	13.30	4.63	17.93	1943...	1.20	14.12	5.97	20.09
1922...	1.61	24.82	0.38	25.20	1933...	.67	12.41	5.41	17.82	1944...	1.21	14.19	5.97	20.16
1923...	1.34	21.06	0.91	21.97	1934...	1.00	13.64	5.21	18.85	1945...	1.22	14.22	6.02	20.24
1924...	1.43	19.46	1.48	20.94	1935...	.97	13.55	5.29	18.84	1946...	1.41	14.69	6.08	20.77
1925...	1.68	20.09	2.11	22.20	1936...	1.09	14.10	5.35	19.45	1947...	1.93	16.93	6.18	23.11
1926...	1.88	20.97	2.41	23.38	1937...	1.18	14.59	5.40	19.99	1948...	2.57	19.54	6.34	25.88
1927...	1.30	18.29	2.80	21.09	1938...	1.13	14.07	5.44	19.51	1949...	2.54	20.26	6.52	26.78
1928...	1.17	17.90	3.04	20.94	1939...	1.02	13.31	5.44	18.75	1950 (Jan.)	2.52	20.10	6.64	26.74





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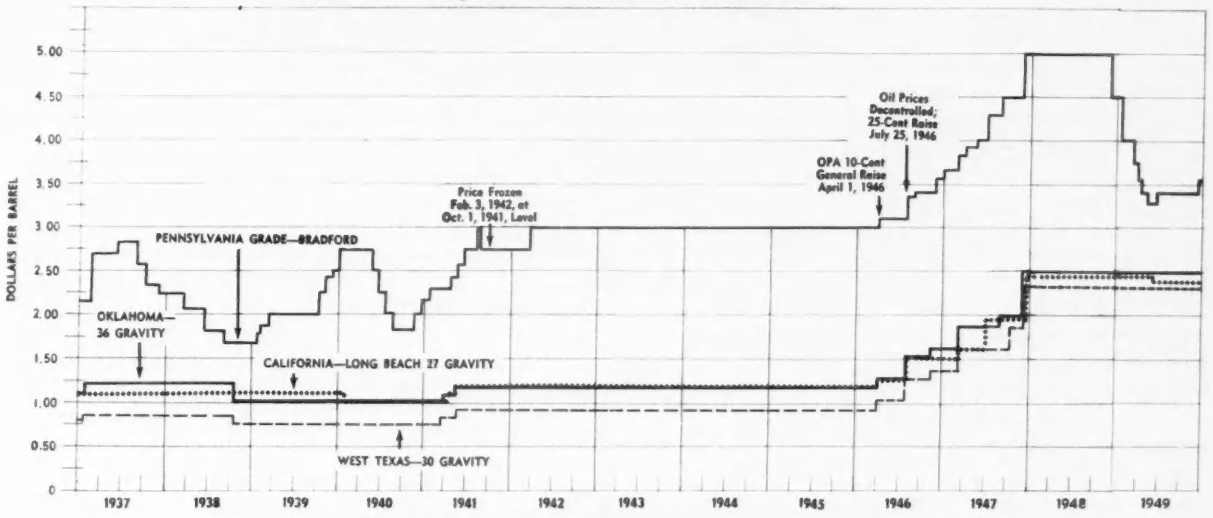
to $3.54 December 12. Fuel oil prices weakened seriously in early 1950, and as a result there were repeated and widespread reductions in posted prices of heavier grade crudes, affecting all sections of the country. Some of the heaviest crudes in California were cut from slightly more than $2 per barrel in 1948 to slightly less than $1 in 1949. Reductions were progressively smaller for lighter crudes, and higher-gravity crudes generally, including 31-31.9 gravity at Long Beach and Wilmington, Calif., have held to 1948 levels.

Petroleum industry prices have continued to show less postwar inflation than prices in general. Government figures show that while prices of all commodities in the aggregate averaged 154.9 percent of the 1926 base level during 1949, the prices of crude petroleum and petroleum products were only 112.2 percent of the 1926 level. While the index for all commodities had reached a postwar peak of 165.0 in 1948, petroleum's peak, also reached in 1948, was 122.0.

Prices of Principal U.S. Grades of Crude Oil



DATE	Pennsylvania Grade, Bradford	Oklahoma-Kansas 36-36.9° Gravity	California, Long Beach 27-27.9° Gravity	West Texas 30-30.9° Gravity
1937—				
Prior to January 1	$2.15	$1.10	$1.10	$0.78
January 28	....	1.22	....	0.88
February 24	2.67	....	....	....
June 7	2.82	....	....	....
September 1	2.60	....	....	....
October 12	2.35	....	....	....
December 1	2.20	....	....	....
1938—				
March 7	2.05	....	....	....
June 13	1.80	....	....	....
September 1	1.68	....	....	....
October 12	....	1.02	....	0.75
1939—				
January 21	1.80	....	....	....
February 1	1.88	....	....	....
March 6	2.00	....	....	....
October 6	2.25	....	....	....
November 1	2.40	....	....	....
December 1	2.50	....	....	....
1940—				
January 1	2.75	....	....	....
February 1	....	....	1.03	....
May 22	2.50	....	....	....
June 18	2.25	....	....	....
July 12	2.00	....	....	....
August 18	1.85	....	....	....
November 12	2.00	....	....	....
December 17	2.15	....	....	....
1941—				
January 27	2.30	....	....	....
March 29	....	....	....	0.82
April 1	....	1.07	....	....
April 23	2.40	....	....	....
April 24	....	....	1.09	....
May 20	2.55	1.17	....	....
May 21	....	....	....	0.92
May 23	....	....	1.15	....
June 18	2.75	....	....	....
August 14	2.98	....	....	....
August 23	2.75	....	....	....
October 1 (Prices later frozen at levels of this date)	2.75	1.17	1.15	0.92

DATE	Pennsylvania Grade, Bradford	Oklahoma-Kansas 36-36.9° Gravity	California, Long Beach 27-27.9° Gravity	West Texas 30-30.9° Gravity
1942—				
February 3 (Prices frozen by O.P.A. at October 1, 1941 level)	$2.75	$1.17	$1.15	$0.92
March 26 (O. P. A. granted Penn. Grade raise)	3.00	....	....	....
1943—(Prices frozen)	....	....	....	....
1944—(Prices frozen)	....	....	....	....
1945—(Prices frozen)	....	....	....	....
1946—				
April 1 (O.P.A. 10c Raise)	3.10	1.27	1.25	1.02
July 25 (Oil Prices Decontrolled)	....	1.52	....	1.27
August 1	3.35	....	1.50	....
September 1	3.41	....	....	....
November 15	....	1.62	....	....
November 19	....	....	....	1.37
December 9	3.55	....	....	....
1947—				
January 1	3.65	....	....	....
March 1	3.81	....	....	....
March 10	....	1.87	....	1.62
March 19	....	....	1.75	....
April 1	3.91	....	....	....
May 16	4.05	....	....	....
July 1	4.30	....	1.95	....
September 1	4.50	....	....	....
October 15	....	2.07	....	....
October 16	....	....	....	1.82
December 1	5.00	....	....	....
December 6	..	2.57	....	....
December 8	....	....	....	2.32
December 27	....	....	2.45	....
1948—				
December 11	4.50	....	....	....
1949—				
January 21	4.00	....	....	....
March 11	3.75	....	....	....
April 1	3.55	....	....	....
April 13	3.40	....	....	....
May 11	3.27	....	....	....
June 1	....	....	2.37	....
June 16	3.40	....	....	....
December 12	3.54	....	....	....

OIL STOCKS

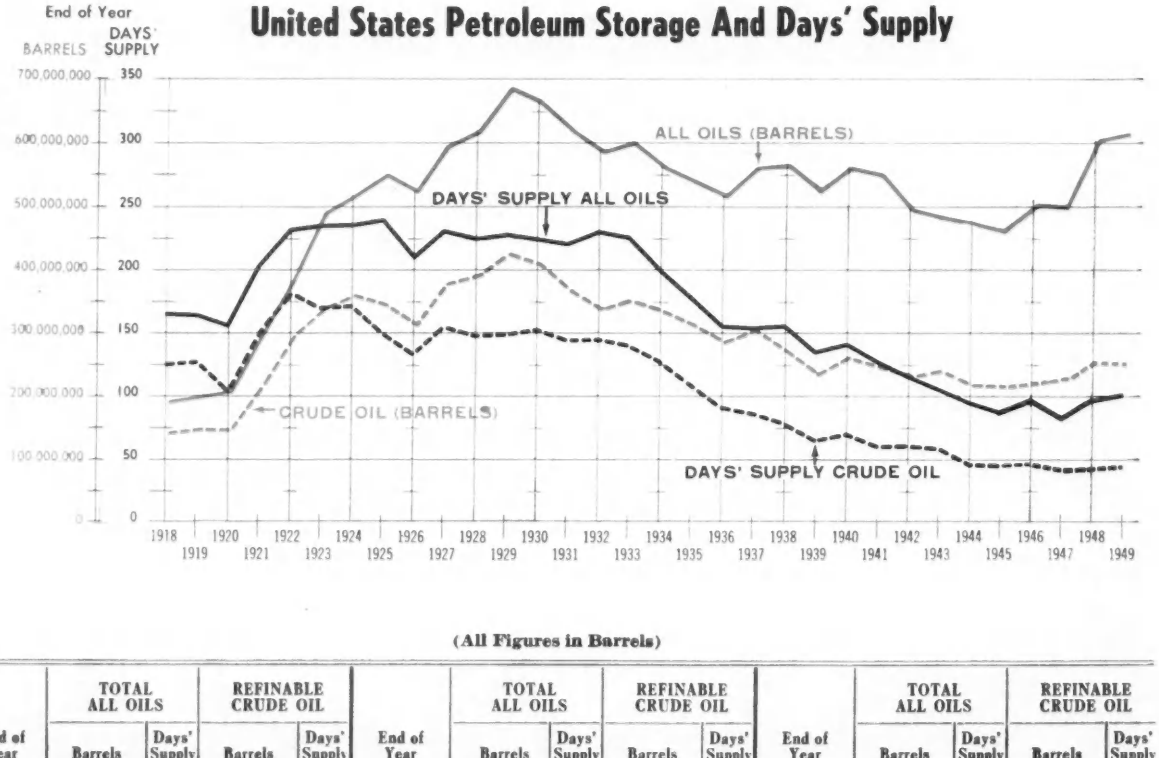
Satisfactory As Year Begins

THE industry has entered 1950 in a relatively good position with regard to stocks of both crude and refined oils, although some surplus of gasoline is indicated, and preservation of a satisfactory stocks situation during 1950 is promised by continuing efforts to keep supply in balance with demand.

In estimating the requirements of domestic crude production in 1950, the U. S. Bureau of Mines made no allowance for either increasing or reducing crude stocks during the year. It did, however, recognize the possibility that stocks of refined products might be still somewhat larger than necessary and that the industry might make a net reduction of about 10 million barrels in 1950 in refined oil stocks, an average of 27,000 barrels daily, by adding to stocks in the second and third quarter somewhat less than withdrawals of the first and fourth quarters in meeting seasonal peak demand for heating oils.

In early 1950, the least favorable factor in the stocks situation was the indication that gasoline stocks were larger than desirable. They were about 10 million barrels above the year-ago trend and close to last spring's all-time peak in going above 127 million barrels in the week ended February 4, 1950. If they continue to run 10 million barrels above last year, the gasoline stocks will go to at least 137 million barrels by the end of March, 1950, and some observers see a possibility that this year's peak may be around 140 million. Making allowance for an increase of about 5 percent in gasoline demand in 1950, it is conceded that a proportional increase in gasoline stocks may be justified. But even on this basis, only about 134 million barrels of gasoline stocks would be justified for the end of March, 1950, instead of the prospec-

United States Petroleum Storage And Days' Supply



(All Figures in Barrels)

End of Year	TOTAL ALL OILS Barrels	TOTAL ALL OILS Days' Supply	REFINABLE CRUDE OIL Barrels	REFINABLE CRUDE OIL Days' Supply
1918	193,411,000	165	144,336,000	125
1919	200,383,000	164	149,356,000	127
1920	209,845,000	156	149,448,000	103
1921	294,428,000	203	217,324,000	150
1922	385,349,000	232	295,708,000	181
1923	492,088,000	235	340,637,000	169
1924	520,287,000	236	360,475,000	171
1925	552,464,000	239	345,863,000	150
1926	527,084,000	210	315,029,000	133
1927	597,176,000	231	379,660,000	155
1928	621,010,000	224	392,629,000	148
1929	689,166,000	228	428,445,000	149
1930	665,497,000	224	411,882,000	153
1931	621,673,000	221	370,194,000	144
1932	590,106,000	230	339,875,000	145
1933	602,198,000	226	354,223,000	140
1934	564,350,000	199	337,254,000	128
1935	541,700,000	178	314,855,000	109
1936	519,229,000	155	288,579,000	91
1937	564,728,000	154	305,833,000	87
1938	567,703,000	156	274,165,000	79
1939	525,838,000	135	238,910,000	66
1940	563,277,000	141	264,079,000	70
1941	552,328,000	127	247,499,000	61
1942	497,940,000	116	234,889,000	61
1943	485,698,000	106	243,506,000	59
1944	477,089,000	95	220,862,000	46
1945	463,579,000	87	218,763,000	45
1946	507,094,000	95	224,473,000	45
1947	502,053,000	85	224,929,000	42
1948	605,189,000	99	246,199,000	43
*1949	614,060,000	101	242,449,000	44

* Total crude stocks of 254,449,000 barrels less estimated 12,000,000 heavy crude in California.

The SECOND NATIONAL BANK OF HOUSTON

MAIN AT RUSK

CONDENSED STATEMENT OF CONDITION AS AT CLOSE OF BUSINESS DECEMBER 31, 1949

Resources:

CASH	$62,374,573.45	
UNITED STATES SECURITIES	58,271,343.08	$120,645,916.53
Municipal Bonds and Other Securities		5,217,297.53
Loans and Discounts	68,538,904.85	
Commodity Loans	12,768,733.08	81,307,637.93
Second National Bank Building (Unencumbered)		1,500,000.00
Future Banking Home Site		849,000.00
Other Real Estate		1.00
Vaults, Furniture and Fixtures		1.00
Interest Accrued on Investments		529,988.84
Customers Liability Under Letters of Credit		2,408,195.12
Customers Liability Under Acceptances		2,172,416.37
Other Resources		48,593.96
		$214,679,048.28

Liabilities:

Capital Stock (250,000 shares, par $20.00—common)	$5,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	3,318,121.08	$13,318,121.08
Reserved for Dividends		200,000.00
Reserved for Taxes, Interest and Other Purposes		940,288.03
Letters of Credit		2,408,195.12
Acceptances		3,155,680.48
DEPOSITS:		
Individual, Firm and Corporation	$155,124,722.11	
Bank (Net)	35,728,215.58	
United States	3,803,825.88	194,656,763.57
		$214,679,048.28

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Stocks of Crude Petroleum in U. S. by Grades, at End of December

(Based on Weekly Reports of U. S. Bureau of Mines)

(THOUSANDS OF BARRELS)

GRADE or ORIGIN	Dec. 27, 1941	Dec. 31, 1948	Dec. 31, 1949	Changes 1941-1949	Changes 1948-1949
Pennsylvania Grade	3,642	2,874	2,837	— 805	— 37
Other Appalachian	1,427	1,455	1,879	+ 452	+ 424
Lima-Michigan	1,360	992	892	— 468	— 100
Illinois-Indiana	18,201	11,977	11,197	— 7,004	— 780
Arkansas	2,708	3,452	3,005	+ 297	— 447
Kansas	7,481	9,168	8,321	+ 840	— 847
Louisiana	12,901	12,147	14,061	+ 1,160	+ 1,914
Northern	4,078	3,004	3,362	— 716	+ 358
Gulf Coast	8,823	9,143	10,699	+ 1,876	+ 1,556
Mississippi	2,290	2,615	2,254	— 36	— 361
New Mexico	6,862	6,321	7,622	+ 760	+ 1,301
Oklahoma	51,582	27,064	29,752	—21,830	+ 2,688
Texas	82,155	120,934	114,534	+32,379	— 6,400
East Texas	20,287	16,600	15,978	— 4,309	— 622
West Texas	18,682	46,726	42,157	+23,475	— 4,569
Gulf Coast	24,153	29,835	30,141	+ 5,988	+ 306
Other Texas	19,033	27,773	26,258	+ 7,225	— 1,515
Panhandle	.....	4,514	3,996	.....	— 518
North	.....	6,674	7,292	.....	+ 618
South	.....	6,752	6,854	.....	+ 102
Other	.....	9,833	8,116	.....	— 1,717
Rocky Mountain	16,095	12,547	13,339	— 2,756	+ 792
California	45,008	33,750	38,149	— 6,859	+ 4,399
Foreign	2,203	7,456	6,607	+ 4,404	— 849
Total in United States	253,915	252,752	254,449	+ 534	+ 1,697

tive actual inventory of 137 to 140 million barrels at that time.

The threatened surplus of several million barrels has caused considerable anxiety about the gasoline market. If gasoline prices should weaken materially because of surpluses, the crude price structure would be seriously jeopardized. Heretofore, gasoline prices consistently have been comparatively firm, in reflection of steadily increasing demand. Only by virtue of relatively favorable gasoline prices has it been possible for crude oil prices to remain generally unchanged, in the face of declines in prices of most other refined products, including distillate fuel oil, kerosine, and residual fuel oil. Weakening of gasoline prices, too, would leave refiners unable to continue paying the established postings for crude.

In 1949 the industry succeeded fairly well in balancing supplies with slowed-down demand, having curtailed both crude production and crude runs to stills. Consequently, there was a halting of heavy additions to storage which had occurred in 1948. In 1949, there was a net reduction of 1,805,000 barrels in crude stocks, an average of 5000 barrels per day. In 1948, crude stocks had been increased 25,600,000 barrels, an average of 70,000 daily. Stocks of refined products and natural gasoline showed an aggregate net increase of 10,676,000 barrels in 1949, an average of 29,000 barrels daily. While this addition was not essential, it was moderate in comparison with the 80,902,000 barrels (221,000 daily average) added to refined oil stocks in 1948.

The increase of 10,676,000 barrels in product stocks in 1949 was the net result of additions of 11.3 million barrels to motor fuel stocks and 6.4 million to distillate fuel oil stocks, accompanied by reductions of 2.3 million barrels in residual fuel oil stocks, 3.1 million in kerosine stocks, and 1.6 million in stocks of other products. Not more than about one-half of the 1949 increase in motor fuel stocks was justified by growth in motor fuel demand, and not much if any increase in distillate fuel oil stocks was justified in the face of reduced demand for that product. Motor fuel stocks at the end of 1949 represented 44 days' supply on the basis of daily average demand during 1949, while stocks a year previously had represented 41 days' supply. Distillate fuel oil stocks at the end of 1949 were equivalent to 84 days' supply, whereas stocks a year previously represented 77 days' supply.

Indicated present surpluses of around 5 million barrels each for motor fuel and distillate fuel oil would take care of increases in demand in 1950, and no further net increases in stocks of those products for 1950 seems justified. Stocks of residual fuel oil, kerosine, lubricants and other products also are ample, if not excessive, and apparently will not require net increases for 1950. Stocks of some of these refined products, in fact, might well be reduced moderately in 1950 and still be quite adequate for meeting all requirements.

Stocks of Major Petroleum Products Held by Refining Companies in the United States at End of December, 1949, Compared with 1941 and 1948

Stocks at refineries, at bulk terminals, in transit, and in pipe lines. Data for 1941 and 1948 from Bureau of Mines monthly reports; for 1949 from weekly reports of American Petroleum Institute.

(THOUSANDS OF BARRELS)

DISTRICT	FINISHED AND UNFINISHED GASOLINE Stocks End of December			KEROSINE Stocks End of December			GASOIL AND DISTILLATE FUEL Stocks End of December			RESIDUAL FUEL OIL Stocks End of December		
	1941	1948	1949	1941	1948	1949	1941	1948	1949	1941	1948	1949
East Coast	21,183	23,376	24,019	2,489	10,330	9,170	18,631	23,158	23,730	10,041	11,917	10,735
Appalachian	3,684	3,551	4,111	311	532	442	704	1,185	1,072	578	713	452
District No. 1	.....	2,439	2,785	.....	401	312	.....	881	846	.....	482	342
District No. 2	.....	1,112	1,326	.....	131	130	.....	304	226	.....	231	110
Indiana, Illinois, Kentucky	18,327	22,307	23,061	1,168	4,301	3,906	5,552	11,395	11,011	4,152	5,465	3,799
Oklahoma, Kansas, Missouri	8,875	10,576	10,687	618	1,227	1,045	1,766	5,279	5,452	2,046	2,956	1,478
Inland Texas	3,288	3,768	3,992	282	639	464	301	854	985	1,349	1,250	963
Texas Gulf Coast	15,831	16,244	16,704	2,949	3,069	3,112	7,801	13,636	14,941	8,710	11,792	6,567
Louisiana Gulf Coast	3,303	6,423	6,419	513	2,392	1,128	1,798	4,159	4,535	2,217	3,816	2,222
North Louisiana and Arkansas	806	2,485	2,744	213	472	300	341	811	647	368	327	270
Rocky Mountains	1,809	2,700	3,676	129	233	296	319	1,627	1,897	535	1,110	677
District No. 3	.....	87	93	.....	34	25	.....	99	74	.....	29	31
District No. 4	.....	2,613	3,583	.....	199	271	.....	1,528	1,823	.....	1,081	646
California	16,992	12,267	18,084	927	700	975	12,713	9,277	13,531	53,199	24,647	34,512
Total United States	94,098	103,697	113,497	9,599	23,895	20,838	49,926	71,381	77,801	83,195	63,993	61,675

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AG-302

Depletion Allowance, Imports Are Major Items in

THE hand of the federal government will rest heavily on the operations of the American petroleum industry in many ways during 1950, and a number of crucial issues are slated for decision that will define more precisely the future relationship between the industry and government.

The government-industry relationship problem has at least two separate fields which, despite their overlap, present distinct areas in which the petroleum industry and the government are coming face to face: 1. over-all administration policies on such matters as taxes, general business controls and broad economic objectives; 2. specific legislation relating solely or primarily to oil and gas, foremost of which are the questions of depletion allowance, imports of foreign oil and possible industry regulation.

Depletion Allowance

Whether the industry will be permitted to retain the depletion tax allowance given it in 1926 became a question of grave importance as a result of a scathing attack on the provision by President Truman and the subsequent proposal for a severe reduction in the allowance from Treasury Department officials. Outcome of this matter will be of greater importance to the industry than any other problem it will face in 1950.

The law provides that 27½ percent of the gross income from oil and gas producing wells be tax free provided the amount of the exemption does not exceed 50 percent of the net income before allowance for depletion. The matter has been reviewed on several occasions by Congressional committees, none of which recommended changes in the practice. However, past attacks have never been as strongly supported by the administration, and it is feared pressure on Congress to raise additional government funds might have an important bearing.

President Truman termed the allowance the most inequitable loophole in the nation's present tax laws, and a shocking example of permitting a few to gain enormous wealth without paying their fair share of taxes. Treasury Department officials, in asking Congress to reduce the allowance from 27½ to 15 percent, estimated the government would gain an additional $200 million annually. High pressure tactics characterized the Treasury Department's effort, the industry being given no time to properly prepare a case for presentation before the Ways and Means Committee.

The industry predicted that any adverse change in the depletion allowance would sharply curtail exploratory and drilling operations, cause the permanent loss of millions of barrels of oil through forced abandonment of thousands of small producing wells, result in higher prices for consumers, put many small operators out of business, and jeopardize national security by reducing this country's producing ability of an essential war commodity. The industry countered the government's proposal by requesting a larger depletion allowance, pointing out annual average earnings by oil companies are below those of other industries.

Imports of Foreign Oil

Enlarged importation rates during 1949, when the U. S. industry was curtailing daily average crude production by 469,000 barrels under 1948 levels, pushed the question of foreign imports into the foreground. Under strong urging from independent operators, Congress may take a hand in the situation unless importers voluntarily reduce volumes.

Wright Patman, chairman of the House Small Business Committee, following hearings on the subject asked President Truman to take appropriate action by proclaiming quotas "under the provisions of the 'escape clauses' in our respective trade agreements." Meanwhile, a bill has been introduced which would provide a tax of $1.05 a barrel on crude, 2½ cents a gallon on gasoline, 4 cents per gallon on lubes, and 1 cent a pound on waxes and paraffin products.

Following a study, the National Petroleum Council's committee on petroleum imports in January declared sharp increases in imports coupled with declining exports has hurt the domestic industry, and that if imports continued growing without regard to the principle of only supplementing domestic production, the U. S. oil industry would be damaged seriously and thus affect the national economy and the national security. The report pointed out U. S. production in 1949 was 832,000 barrels under maximum efficient rates.

The furor over imports reached new heights at the beginning of 1950. Import volumes reached 750,000 barrels daily by the end of the year compared with an average of 636,000 barrels for the year 1949, and testimony of 11 principal importers before the House Small Business Committee indicated nearly 800,000 barrels would be imported daily during the first six months of 1950.

With the clamor for import restrictions mounting, several large importing companies in recent weeks announced they would reduce imports below programmed levels for the first half of 1950. Undoubtedly, this was a move to ward off the threat of government restrictions on imports. While favoring voluntary curtailment, members of the Independent Petroleum Association of America declared announced reductions were insignificant, pointing out that reductions from planned levels for 1950 would still leave these companies importing nearly 20 percent more than they did in the first half of 1949 and about 10 percent above rates for the full year of 1949.

If imports are not immediately reduced by substantial volumes, independent operators can be expected to continue demanding legislative or administrative action to cut back the movement of foreign oil into this country.

Federal Regulation Measure

Another proposed federal legislative matter of interest to the industry is the Harris Bill, which would create a Petroleum Policy Council for the purpose

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BAASH-ROSS TOOL CO[illegible] ANGELES • HOUSTON • OKLAHOMA CITY • NEW YORK

OUR 29th YEAR

It's BAASH-ROSS... FOR EVERYTHING IN SQUARE KELLYS.

All Sizes—All Designs—All Lengths

PLUS the Most Advanced Construction and Metallurgical Features!

FOR YEARS Baash-Ross has led in the development of a superior line of square Kellys to meet the increasingly rigid requirements of modern drilling operations. And best of all, these top-quality Kellys are available in a range of sizes and designs to meet every operator's need... with or without stop shoulders, elevator spaces, etc.... and in all lengths.

In fact, Baash-Ross provides everything in square* Kellys!

They have Everything in Performance Features!

- Baash-Ross Square Kellys are forged end-to-end from one solid piece of restricted analysis, fine-grained alloy steel, with each heat of steel individually checked for quality by separate test specimens.
- After forging and before heat treating, the dimensional accuracy of the forged square section is checked by an API Kelly Sleeve Gage which must pass freely over the entire length of the square to check maximum allowable tolerances across flats and across corners. Also, accurate caliper measurements are taken to make sure no portion of the driving section is undersize!
- Next, a series of heat-treating operations performed over the *entire length* of the Kelly in one operation, develop the metallurgical properties of the steel to provide the *best balance* of shock-resisting toughness and wear-resisting hardness.
- Additional heat-treatments harden the threaded ends for maximum life and service.
- All residual forging stresses are relieved by these heat-treating processes, thus eliminating the most prevalent cause of bending and deformation.
- The Kellys are then carefully bored by precision drilling machines so that the bore is precisely centered end-to-end, then double-checked by highly-accurate survey devices. For products with bores 2¼" diameter or larger, wall thickness of the Kelly *must not* vary more than *one-sixteenth* inch for each 10 ft. of product length, or fraction thereof.
- The Kelly itself is also accurately surveyed for straightness and *must* be straight within *one-eighth* inch when measured at *any* point over its entire length.
- The alignment of the projected axis of each threaded end, when checked with the precise Baash-Ross Alignoscope, *must* be within *one-eighth* inch of the longitudinal axis of the Kelly for each 10 ft. of Kelly length, or fraction thereof.
- In addition, threads *must* pass, not only all API specifications, but also unusually rigid Baash-Ross specifications on thread form, taper, lead, finish, etc.

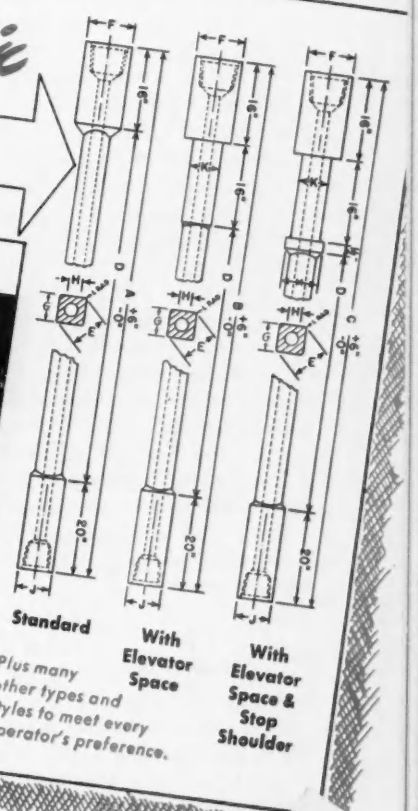
The above highlight only a few of the many controls maintained by Baash-Ross to insure absolute straightness, long-life and maximum all-around performance from every Baash-Ross Kelly!

They are Available in .. All Sizes .. All Designs

Baash-Ross "Trubore" Forged Upset Square Kellys

Nominal Size In.	LENGTHS Overall A Ft.	Overall B Ft.	Overall C Ft.	Working Length D Ft.	Top Upset Joint Size A.P.I. Left Hand In.	Top Upset O.D. F In.	Bottom Upset Joint Size A.P.I. Right Hand In.	Bottom Upset O.D. J In.	Bore I.D. H In.	Across Corner E In.	Across Flat G In.	Elevator Space O.D. K In.	Corner Radius L In.	Stop Shoulder O.D. M In.	† Cu. Ft. per Lin. Ft.
2½	35 38 40	36–4 39–4 41–4	36–6 39–6 41–6	32 35 37	4½ Reg. 6⅝ Reg.	5½* 7⅝	2⅜ Reg. 2⅞ I.F.	3¼ 3⅝	1¹⁄₁₆ 1¹⁄₁₆	3¹⁄₃₂	2⅝	2⁷⁄₁₆	⅝	3⅜	*.165 .327
3	35 38 40	36–4 39–4 41–4	36–6 39–6 41–6	32 35 37	4½ Reg. 6⅝ Reg.	5½* 7⅝	2⅞ Reg. 2⅞ I.F.	3⅜ 4⅛	1¼ 1⅜	3¹³⁄₁₆	3	2¹³⁄₁₆	⅝	4⅛	*.165 .327
3½	35 38 40	36–4 39–4 41–4	36–6 39–6 41–6	32 35 37	4½ Reg. 6⅝ Reg.	5½* 7⅝	3½ Reg. 3½ F.H. 3½ I.F.	4⅛ 4⅝ 4⅞	1½ 2¼ 2¼	4¹⁄₁₆	3½	3¹³⁄₃₂	⅞	4⅝	*.165 .327
4½	35 38 40	36–4 39–4 41–4 55–4	36–6 39–6 41–6 55–6	32 35 37	4½ Reg. 6⅝ Reg.	5½* 7⅝	4½ Reg. 4½ F.H. 4½ I.F.	5½* 5⅞ 6⅛	2¼ 2⅝ 2⅝	5⅛	4¼	4¹⁵⁄₃₂	⅞	4¾	*.165 .327
5½	38 40 54	39–4 41–4 55–4	39–6 41–6 55–6	35 37 51	6⅝ Reg.	7⅝	5½ Reg. 5½ F.H. 5½ I.F.	6⅜ 7⅛	2⅝ 3¼ 3¼	6²⁵⁄₃₂	5¼	5⅝	⅞	5⅝	*.165 .327
6	38 40 54	39–4 41–4 55–4	39–6 41–6 55–6	35 37 51	6⅝ Reg.	7⅝	6⅝ Reg. 6⅝ F.H.	7⅝ 8	3½ 3½	7²⁹⁄₃₂	6	6¾	1	8	.327

Sizes shown in RED are A.P.I. standard.
* Alternate 5¾ inches O.D.—180 cu. ft. per lineal ft
† Volume based on largest diameter of kelly



Plus many other types and styles to meet every operator's preference.

The Baash-Ross lines of Hexagon and Octagon Kellys are equally complete. Write for data.

BAASH-ROSS KELLYS ARE AVAILABLE THROUGH LEADING SUPPL[illegible]

of formulating and clarifying governmental petroleum policies at home and abroad.

The council initially would be composed of representatives from the Interior, State and Commerce departments, the National Security Resources Board and the National Military Establishment, with the President empowered to add the participation of other agencies. The council would recommend legislation to Congress which would effectuate its policies, and employ experts and special agents as might be needed.

The purpose of the council would be "to coordinate, unify, clarify and recommend the formulation (for application at home and abroad) of petroleum policies affecting agencies of Government relating to:

"(1) the development of the domestci petroleum industry in order to meet, to maximum practical extent, emergency petroleum requirements; (2) Western Hemisphere development; (3) worldwide development; (4) furtherance of conservation; (5) development of new sources of liquid fuels including Federal sponsorship of research and development of processes for their production from gas, coal, shale and tar sands; (6) stock-piling; (7) encouragement of exploration and development of public lands; (8) fuel efficiency; (9) dispersal of refining facilities; (10) adequacy of tankers; (11) imports to supplement domestic supply consistent with the maintenance of a healthy domestic industry; and (12) development and maintenance of a plan for an emergency petroleum organization in the event of a national emergency."

The industry sees this proposal as a threat to private business and a possible step toward federal control of the oil business. The purposes and powers are stated in such broad and sweeping terms that the effect of the measure would seem to depend on their interpretations and applications.

Tidelands Question

The year should see the bitter dispute between the federal government and the states over control of the offshore coastal oil lands come to a head. Sometime late in 1950 the Supreme Court is expected to hand down its decision in the important Texas and Louisiana cases.

Efforts to compromise the tidelands issue now are stalled and Congress is unlikely to take action, so the outcome depends upon the Supreme Court.

Natural Gas Act Amendment

During the last session the House passed and the Senate now is considering a bill to amend the Natural Gas Act so as to exclude specifically producers and gatherers from jurisdiction of the Federal Power Commission.

The industry long has advocated this action and still is hopeful that Congress will enact such a measure. However, Senate leaders have shown no readiness yet to let the matter come to the floor, and it may remain bottled up in committee.

Divorcement

The long standing question of separating producing, transportation and marketing functions is still with the industry, and now in two forms.

One is through legislative channels, where Senator Guy Gillette (Iowa) is pressing his divorcement bills introduced a year ago. So far not many Senators have indicated they will go along with objectives of the measure.

Of more immediate significance is the Department of Justice's attempt to divorce the marketing sector of the industry. Argument has been heard before the Supreme Court reviewing the Standard Oil Company of Indiana case, wherein a lower court upheld a Federal Trade Commission order requiring that the company cease offering jobber discounts to larger buyers even though such discounts were given in good faith to meet competition. If this lower court decree is upheld by the high court, the entire wholesale marketing pattern of the industry is jeopardized.

In the same vein, the Justice Department has filed suit against Sun Oil Company accusing it of imposing exclusive dealer contracts on its independent service station operators. The Attorney General asks that Sun alter its contract forms and if competition is not then restored that the company divorce itself of all retail outlets. Sun calls the charges false and has demanded an immediate court hearing.

General Tax Matters

The oil industry, along with all other business, is keenly interested in proposed corporate tax changes. Sharp differences of opinion seem to exist between the President and Congress on this issue, and at this time it is difficult to foretell what changes might be made in the tax laws.

It does appear that only small businesses can hope for any tax relief, and that any substantial benefit even for them is doubtful. Larger companies face prospects of higher tax in a number of forms, particularly higher tax rates on big earnings. It seems likely that corporate income scales may be modified in favor of small business; flattening out brackets and making tax-exempt the first $25,000 in business income, but with higher tax rates on income over this amount.

The increased social security levy will be an additional burden. There is some demand also for boosting the federal 1½-cent per gallon gasoline tax to finance a huge highway expansion program.

Price Inquiry

The Senate Banking Committee is expected to pursue its inquiry into oil prices for the purpose of recommending new legislation. The committee held one meeting on gasoline prices during the last session, and threatens to extend its investigation into fuel oil and the relationship of proration policy to the maintenance of price structure.

Perhaps more dangerous is the O'Hara resolution demanding an investigation of petroleum prices, their link with state conservation laws, and all relevant questions. There is a feeling that this bill might at least receive favorable report out of the committee.

Mexican Loan

It is likely that an effort will be made to push through the Administration-sponsored oil loan to Mexico. Robert Crosser (Dem., Ohio), chairman of the House Interstate and Foreign Commerce Committee, is actively urging the loan and threatens to take all means necessary to expedite it. The loan is almost unanimously opposed by U. S. oil men.

Synthetic Liquid Fuels

The synthetic liquid fuels problem will be less important in the present session of Congress than it was last year, when a $700 million bill pended for construction of three experimental commercial-size synthetics plants. Congress is expected now to wind up with a plan for only one plant to cost about $100 million.

Given greater attention will be the Truman program for federal interest in the $700 million synthetic rubber industry. Truman has asked Congress to give the White House control over production and consumption regulation of synthetic rubber for ten years.

Corporate Mergers

Congress is generally favorable to the pending Kefauver Bill amending the Clayton Act's restrictions on corporate mergers. This act now prohibits one corporation from acquiring the capital stock of another where such acquisition would tend to create monopoly or reduce competition. The amendment would extend the curb to acquisition of physical assets.

3.7 Percent Increase Made in EXPLORATORY DRILLING

By CECIL W. SMITH
Statistical Editor

THE industry enjoyed a year of successful exploratory drilling in 1949, which saw a record number of tests drilled and a new all-time high of producers completed. While drilling in general lagged from the peak of 1948, exploration bettered that year's record-mark by 3.7 percent.

A total of 7464 exploratory tests were completed in 1949 to exceed the 7197 wells of 1948 that had been the highest on record. Not only in over-all volume were the year's wells greatest, but the number of producers among them was also the largest ever recorded. Tests proving productive in 1949 numbered 1522 to account for 20.4 percent of the total drilled. A year earlier, 1421 producers amounted to 19.7 percent of all exploratory ventures. All of which shows that the 1949 campaign was a little more successful as far as producer-to-failure ratio goes.

Of the year's successful attempts, 675 wells opened new oil fields and 284 others found new oil pay horizons in previously discovered fields, to add 959 new oil pools to the nation's list. In 1948, new oil pools totaled 917 and were composed of 610 new fields and 307 new pay strata.

Largely as a result of the year's successful exploratory campaign, substantial additions were made to the nation's crude reserves. These additions amounted to almost twice as much as was produced during the year. Although new reserves added in 1949 were slightly less than those recorded for 1948, it was probable that reserves due to new discoveries were greater in 1949 than was the case for 1948. Reserve additions credited to a year are the combined results of discoveries and exploitation of previous discoveries, and 1949 with more discoveries, but fewer development wells, almost matched additions of 1948.

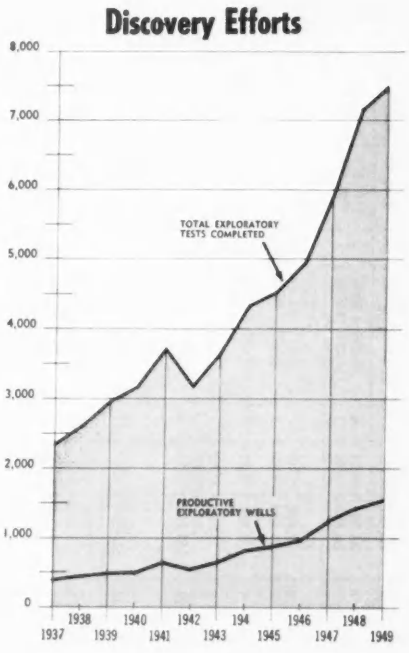
Natural gas discoveries totaled 150 in 1949, while a year earlier these finds numbered 160. New gas fields totaling 122 made up the bulk of the discoveries, with the remaining 28 being new gas pay strata in existing fields. In comparison, 112 new fields and 48 new gas pays were located in 1948.

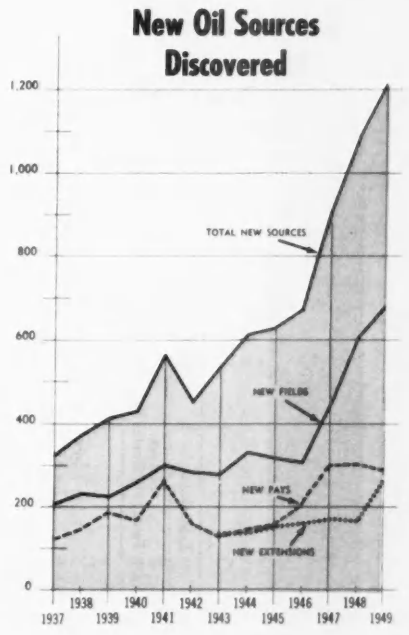
New distillate pools discovered in 1949 totaled 121 compared with 115 in 1948. These discoveries were composed of 69 new fields in the past year against 70 in 1948, and 52 new pay strata compared with 45.

Included with new field and new pay discoveries to make up productive exploratory wells, with which this compilation deals, are the major extensions to established fields. In this type exploration, the year just past had considerably more activity and success than did the previous year. To be classed as an extension, the extending well had to be at least one-half mile outside production coming from the same sand.

The larger part of these extension wells were successful in expanding the boundaries of crude producing fields. These totaled 261 in 1949 against the previous year's 170.

(See Tables on Pages 58-59)





YEAR	Total New Oil, Gas and Distillate Sources Found			New Oil Sources Found			New Gas Sources Found			New Distillate Sources Found		
	Total	New Fields	New Pays	Total	New Fields	New Pays	Total	New Fields	New Pays	Total	New Fields	New Pays
1937	376	239	137	322	203	119	48	33	15	6	3	3
1938	423	264	159	373	229	144	42	31	11	8	4	4
1939	473	258	215	414	224	190	55	33	22	4	1	3
1940	492	309	183	428	261	167	62	46	16	2	2	0
1941	650	362	288	562	301	261	83	58	25	5	3	2
1942	523	348	175	451	288	163	57	47	10	15	13	2
1943	499	347	152	403	276	127	72	56	16	24	15	9
1944	633	460	173	475	326	149	117	102	15	41	32	9
1945	647	451	187	475	317	158	128	113	15	44	30	14
1946	688	412	276	513	308	205	104	75	29	71	29	42
1947	979	576	403	736	436	300	145	96	49	98	44	54
1948	1192	792	400	917	610	307	160	112	48	115	70	45
1949	1230	866	364	959	675	284	150	122	28	121	69	52

Results of Exploratory Drilling in the United States in 1949, by States, and Comparison with Earlier Years

(Based on Data Compiled by Staff of World Oil)

Part 1: Productive Tests

State or District	OIL									DISTILLATE									GAS									TOTAL PRODUCTIVE		
	New Fields			New Pays			Extensions			New Fields			New Pays			Extensions			New Fields			New Pays			Extensions					
	No.	Footage	Avge Depth	No.	Footage	Avge Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge Depth	No.	Footage	Avge Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth	No.	Footage	Avge. Depth
Alabama	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	...	.....	....
Arizona	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	...	.....	....
Arkansas	6	34,803	5800	5	20,453	4091	1	3,520	3520	..	.....	....	..	.....	....	..	.....	....	2	8,524	4262	..	.....	....	..	.....	....	14	67,300	4807
California	10	42,310	4231	10	45,739	4574	15	55,735	3716	..	.....	....	..	.....	....	..	.....	....	3	23,760	7920	..	.....	....	2	9,867	4933	40	177,411	4435
Colorado	1	6,747	6747	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	1	4,223	4223	..	.....	....	..	.....	....	2	10,970	5485
Florida	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	...	.....	....
Georgia	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	...	.....	....
Illinois	23	51,863	2255	32	83,460	2608	54	133,581	2474	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	4	2,902	725	113	271,806	2405
Indiana	37	68,299	1846	3	8,288	2762	5	12,262	2452	..	.....	....	..	.....	....	..	.....	....	5	7,714	1542	..	.....	....	..	.....	....	50	96,563	1931
Kansas	75	262,598	3501	4	16,013	4003	6	20,021	3337	..	.....	....	..	.....	....	..	.....	....	5	16,594	3318	..	.....	....	..	.....	....	90	315,226	3502
Kentucky	16	28,602	1788	2	3,715	1857	3	4,937	1646	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	21	37,254	1774
Louisiana	31	258,792	8348	28	243,719	8704	13	95,447	7419	17	186,462	10968	16	169,945	10622	2	22,485	11242	5	39,159	7832	2	10,795	5397	..	.....	....	114	1,027,804	9016
North Louisiana	11	69,148	6286	5	30,877	6176	6	35,584	5931	4	36,259	9064	9	80,476	8942	..	.....	....	2	8,631	4315	..	.....	....	..	.....	....	...	260,975	7053
South Louisiana	20	189,644	9482	23	212,842	9254	7	60,863	8695	13	150,203	11554	7	89,469	12781	2	22,485	11242	3	30,528	10177	2	10,795	5397	..	.....	....	77	766,829	9959
Maryland	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	1	4,900	4900	..	.....	....	..	.....	....	1	4,900	4900
Michigan	19	39,080	2057	1	942	942	5	8,597	1719	..	.....	....	..	.....	....	..	.....	....	2	5,379	2699	1	3 545	3545	..	.....	....	28	57,543	2055
Mississippi	6	55,248	9208	2	16,937	8468	1	5,220	5220	1	6,952	6952	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	10	84,357	8435
Missouri	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....
Montana	5	19,663	3932	1	3,586	3586	1	2,991	2991	1	9,446	9446	..	.....	....	..	.....	....	1	1,220	1220	..	.....	....	..	.....	....	9	36,906	4101
Nebraska	1	4,429	4429	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	1	4,429	4429
New Mexico	14	128,219	9159	5	48,314	9662	4	24,051	6012	..	.....	....	..	.....	....	..	.....	....	3	22,165	7388	..	.....	....	..	.....	....	26	222,749	8567
Ohio	..	.....	....	..	.....	....	3	8,080	2693	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	1	3,331	3331	4	11,411	2852
Oklahoma	63	270,158	4288	25	132,231	5289	25	148,121	5925	3	14,069	4689	3	16,016	5338	1	6,060	6060	9	24,943	2771	5	16,018	3203	..	.....	....	134	627,616	4683
Pennsylvania	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	2	13,814	6907	..	.....	....	..	.....	....	2	13,814	6907
South Dakota	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	...	.....	....
Tennessee	2	2,234	1117	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	2	2,234	1117
Texas	347	1,638,848	4723	156	950,731	6094	115	650,533	5657	47	427,525	9096	33	273,056	8274	13	103,436	7957	71	379,259	5342	20	100,945	5047	8	46,845	5856	810	4,571,178	5643
Dist. 1: S. Central	15	39,087	2606	2	7,389	3694	3	12,809	4270	1	6,920	6920	..	.....	....	..	.....	....	..	.....	....	..	.....	....	1	6,503	6503	22	72,708	3305
Dist. 2: Middle Gulf	10	65,578	6558	10	67,712	6771	3	19,359	6453	17	137,303	8076	8	63,113	7889	6	49,954	8325	14	96,615	6901	4	20,752	5189	3	10,478	3492	75	530,864	7078
Dist. 3: Upper Gulf	18	150,399	8356	48	323,204	6733	6	43,512	7252	15	147,829	9855	11	91,047	8277	3	27,425	9145	7	52,625	7518	3	12,651	4217	1	7,714	7714	112	856,406	7646
Dist. 4: L.Gulf-S.W.	24	118,809	4950	37	246,744	6669	7	38,829	5547	11	102,106	9282	12	98,913	8243	1	8,992	8992	16	85,618	5351	10	52,188	5219	1	7,345	7345	119	759,544	6382
Dist. 5: E. Central	2	5,720	2860	..	.....	....	..	.....	....	1	16,347	16347	..	.....	....	1	4,052	4052	1	3,287	3287	1	8,150	8150	..	.....	....	6	37,556	6259
Dist. 6: Northeast	12	77,713	6476	1	7,518	7518	1	10,461	10461	2	17,020	8510	2	19,983	9991	2	13,013	6506	2	10,972	5486	..	.....	....	1	6,200	6200	23	162,880	7082
Dist. 7-B: N. Cent.	112	386,132	3447	17	57,641	3391	8	28,586	3573	..	.....	....	..	.....	....	..	.....	....	18	65,611	3645	1	4,501	4501	..	.....	....	156	542,471	3477
Dist. 7-C: W. Cent.	21	110,735	5273	11	58 790	5345	12	82,707	6892	..	.....	....	..	.....	....	..	.....	....	4	14,940	3735	..	.....	....	..	.....	....	48	267,172	5566
Dist. 8: West	41	317,047	7732	14	117,690	8406	54	320,789	5940	..	.....	....	..	.....	....	..	.....	....	2	17,879	8939	1	2,703	2703	1	8,605	8605	113	784,713	6944
Dist. 9: North	91	358,073	3935	16	64,043	4002	21	93,481	4451	..	.....	....	..	.....	....	..	.....	....	7	31,712	4530	..	.....	....	..	.....	....	135	547,309	4054
Dist. 10: Panhandle	1	9,555	9555	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	1	9,555	9555
Utah	2	18,249	9124	..	.....	....	1	4,255	4255	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	3	22,504	7501
West Virginia	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	..	.....	....	11	54,866	4987	..	.....	....	..	.....	....	11	54,866	4988
Wyoming	17	112,186	6599	10	64,473	6447	9	41,213	4579	..	.....	....	..	.....	....	..	.....	....	1	7,214	7214	..	.....	....	..	.....	....	37	225,086	6083
U.S. Total, 1949	675	3,042,328	4507	284	1,638,601	5770	261	1,219,564	4673	69	644,454	9339	52	459,017	8827	16	131,981	8248	129	613,734	5030	28	131,303	4689	15	62,945	4196	1522	7,943,927	5219
U. S. Total, Earlier Years																														
1948	610	2,760,127	4525	307	1,714,345	5584	170	758,977	4465	70	626,026	8943	45	432,625	9614	18	167,441	9302	112	514,990	4598	48	259,025	5396	41	162,801	3971	1421	7,396,357	5205
1947	436	1,999,100	4585	300	1,564,181	5214	169	693,950	4106	44	352,691	8016	54	505,112	9354	17	136,258	8015	96	403,038	4198	49	223,026	4552	77	254,076	3300	1242	6,131,432	4937
1946	308	1,359,787	4415	205	1,227,305	5987	160	707,585	4422	29	264,441	9119	42	411,425	9796	7	63,111	9016	75	272,564	3634	29	166,588	5744	115	406,774	3537	970	4,879,580	5030
1945	317	1,503,763	4774	158	894,688	5663	154	702,822	4564	30	269,915	8997	14	140,464	10033	6	54,162	9027	113	486,529	4306	15	67,455	4497	70	216,103	3087	877	4,335,901	4944
1944	326	1,422,250	4363	149	731,764	4911	135	659,987	4889	32	250,228	7820	9	75,436	8382	10	79,797	7980	102	417,944	4097	15	95,099	6340	27	111,174	4118	805	3,843,679	4775
1943	276	1,232,396	4465	127	565,454	4452	132	559,090	4236	15	140,564	9371	9	88,031	9781	3	25,589	8530	56	212,814	3800	16	90,372	5648	10	58,996	8530	644	2,973,306	4617
1942	288	1,199,382	4165	163	879,116	5393	..	.....	....	13	121,620	9355	2	13,517	6759	..	.....	....	48	167,428	3562	10	50,712	5071	..	.....	....	524	2,431,775	4650
1941	301	1,165,966	3874	261	1,335,648	5117	..	.....	....	3	23,505	7835	2	7,109	3555	..	.....	....	58	177,974	3069	25	89,263	3571	..	.....	....	650	2,799,465	4307
1940	262	957,167	3667	167	914,442	5476	..	.....	....	2	12,792	6396	..	.....	....	..	.....	....	46	122,439	2662	16	55,983	3499	..	.....	....	493	2,062,823	4193
1939	224	782,289	3492	190	998,595	5256	..	.....	....	1	7,999	7999	3	24,709	8236	..	.....	....	33	103,450	3135	22	92,626	4210	..	.....	....	473	2,009,668	4249
1938	229	944,455	4124	144	815,186	5661	7	25,027	3575	4	23,657	5914	4	27,115	6779	..	.....	....	31	102 440	3350	11	49,634	4512	3	12,042	4014	433	1,999,556	4618
1937	203	831,123	4094	119	615,007	5168	3	9,036	3012	3	19,377	6459	3	24,574	8191	..	.....	....	33	77,389	2345	15	51,145	3410	..	.....	....	379	1,627,651	4295

Results of Exploratory Drilling in the United States in 1949, by States, and Comparison With Earlier Years

Part 2: Unproductive Tests and Total Exploratory Tests

STATE or DISTRICT	DRY WILDCATS			DRY NEW PAY TESTS			DRY OUTPOSTS			TOTAL DRY			TOTAL EXPLORATORY TESTS		
	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth
Alabama	13	68,340	5257							13	68,340	5257	13	68,340	5257
Arizona	5	15,603	3120							5	15,603	3120	5	15,603	3120
Arkansas	80	290,799	3635	1	4,010	4010	4	16,862	4215	85	311,671	3667	99	378,971	3828
California	350	1,249,043	3569	8	46,681	5835	14	81,962	5854	372	1,377,686	3703	412	1,555,097	3774
Colorado	47	190,277	4048				1	6,240	6240	48	196,517	4094	50	207,487	4149
Florida	15	90,782	6052							15	90,782	6052	15	90,782	6052
Georgia	4	12,437	3109							4	12,437	3109	4	12,437	3109
Illinois	653	1,381,940	2116							653	1,381,940	2116	766	1,653,746	2160
Indiana	363	682,918	1881							363	682,918	1881	413	779,481	1887
Kansas	411	1,457,217	3545							411	1,457,217	3545	501	1,772,443	3537
Kentucky	58	115,933	1999							58	115,933	1999	79	153,187	1939
Louisiana	221	1,616,303	7314	1	11,317	11317	1	10,955	10955	223	1,638,575	7348	337	2,666,379	7912
North Louisiana	124	618,352	4987	1	11,317	11317				125	629,669	5037	162	890,644	5498
South Louisiana	97	997,951	10288				1	10,955	10955	98	1,008,906	10294	175	1,775,735	10147
Maryland													1	4,900	4900
Michigan	300	657,132	2190				1	8,917	8917	301	666,049	2213	329	723,592	2199
Mississippi	114	771,523	6768				3	17,795	5931	117	789,318	6746	127	873,675	6879
Missouri	17	11,251	662							17	11,251	662	17	11,251	662
Montana	36	131,422	3651				1	4,355	4355	37	135,777	3670	46	172,683	3754
Nebraska	8	32,775	4097							8	32,775	4097	9	37,204	4134
New Mexico	59	233,636	3960	1	12,657	12657	3	17,000	5666	63	263,293	4179	89	486,042	5461
North Dakota	5	26,465	5293							5	26,465	5293	5	26,465	5293
Ohio	32	114,475	3577							32	114,475	3577	36	125,886	3497
Oklahoma	451	1,746,981	3873							451	1,746,981	3873	585	2,374,597	4059
Pennsylvania	2	12,645	6322							2	12,645	6322	4	26,459	6614
South Dakota	6	12,803	2134							6	12,803	2134	6	12,803	2134
Tennessee	31	31,380	1012							31	31,380	1012	33	33,614	1019
Texas	2,376	10,060,897	4234	6	33,592	5598	75	400,253	5336	2,457	10,494,742	4271	3,267	15,065,920	4611
Dist. 1: South Central	234	636,473	2720				5	19,232	3846	239	655,705	2743	261	728,413	2791
Dist. 2: Middle Gulf	151	842,508	5579				7	44,360	6337	158	886,868	5613	233	1,417,732	6084
Dist. 3: Upper Gulf	238	1,727,667	7259	1	11,600	11600	8	53,602	6700	247	1,792,869	7258	359	1,649,275	7380
Dist. 4: Lower Gulf-S.W.	316	1,435,076	4541	1	4,860	4860	8	58,691	7336	325	1,498,627	4611	444	2,258,171	5086
Dist. 5: East Central	74	304,194	4111				1	5,468	5468	75	309,662	4129	81	347,218	4287
Dist. 6: Northeast	74	402,421	5438	2	9,063	4531	4	26,151	6538	80	437 635	5470	103	600,515	5830
Dist. 7-B: North Central	532	1,657,057	3115	2	8,069	4034	9	28,470	3163	543	1,693,596	3119	699	2,236,067	3199
Dist. 7-C: West Central	109	559,396	5132				3	12,281	4093	112	571,677	5104	160	838,849	5243
Dist. 8: West	174	935,264	5375				13	78,946	6072	187	1,014,210	5423	300	1,798,923	5996
Dist. 9: North	467	1,505,459	3224				17	73,052	4297	484	1,578,511	3261	619	2,125,820	3434
Dist. 10: Panhandle	7	55,382	7912							7	55,382	7912	8	64,937	8117
Utah	22	132,391	6018				1	4,378	4378	23	136,769	5946	26	159,273	6126
Virginia	1	7,401	7401							1	7,401	7401	1	7,401	7401
Washington	1	9,344	9344							1	9,344	9344	1	9,344	9344
West Virginia	5	32,686	6537							5	32,686	6537	16	87,552	5472
Wyoming	128	586,658	4583				7	39,580	5654	135	626,238	4638	172	851,324	4950
United States Total, 1949	5,814	21,783,457	3747	17	108,257	6368	111	608,297	5480	5,942	22,500,011	3787	7,464	30,443,938	4079
U. S. Total, Earlier Years															
1948	5,618	22,227,790	3957	23	127,597	5548	135	574,023	4252	5,776	22,929,410	3970	7,197	30,325,767	4214
1947	4,407	17,068,382	3873	59	330,897	5608	166	659,738	3974	4,632	18,059,017	3899	5,874	24,190,440	4118
1946	3,830	14,399,824	3760	38	274,592	7226	109	418,919	3843	3,977	15,093,335	3795	4,947	19,972,915	4037
1945	3,486	14,504,642	4161	39	284,441	7293	108	375,062	3473	3,633	15,164,145	4174	4,510	19,500,046	4324
1944	3,425	13,470,846	3933	22	141,039	6411	73	383,802	5258	3,520	13,995,687	3976	4,325	17,839,366	4125
1943	2,951	10,702,429	3627				36	164,155	4560	2,987	10,866,584	3638	3,631	13,839,890	3812
1942	2,652	9,320,691	3515							2,652	9,320,691	3515	3,176	11,752,466	3702
1941	3,047	9,651,013	3167							3,047	9,651,013	3167	3,697	12,450,478	3368
1940	2,672	8,649,828	3237							2,672	8,649,828	3237	3,165	10,712,651	3386
1939	2,488	7,764,816	3121							2,488	7,764,816	3121	2,961	9,774,484	3301
1938	2,179	7,012,901	3218							2,179	7,012,901	3218	2,612	9,012,457	3450
1937	1,943	7,173,550	3692							1,943	7,173,550	3692	2,322	8,801,201	3790

WILDCATTING SUCCESS

Gains Percentagewise in 1949

AN INTENSIVE search for additional oil and gas producing sources was continued in the U. S. during 1949, when a record number of strict wildcat tests were completed despite a drop in total drilling. The year saw 6680 wildcat tests completed in contrast with 6182 in 1948, although total wells drilled dropped from 39,477 to 38,534. Thus, 17.3 percent of all drilling was devoted to the search for entirely new fields while only 15.9 percent of the 1948 drilling was for this purpose.

The results were highly successful, 13 percent of the wildcats finding production whereas the average for the 12 years 1937-1948 has been only 11.1 percent productive. Texas was the most active wildcatting spot with 2841 test, but Louisiana was the most successful area with 19.3 percent of all wildcats productive.

Ratio of Wildcatting to All Drilling and Proportion of Wildcats Discovering New Fields, By Districts, 1937-1949

STATE or DISTRICT	TWELVE YEARS, 1937-1948						YEAR, 1949					
	Total New Wells Drilled (All Classes)	*STRICT WILDCATS					Total New Wells Drilled (All Classes)	*STRICT WILDCATS				
		Total			Productive			Total			Productive	
		Number	Percent of All Wells	Dry	Number	Percent of All Strict Wildcats		Number	Percent of All Wells	Dry	Number	Percent of All Strict Wildcats
Alabama	201	153	76.1	150	3	2.0	18	13	72.2	13	.....	.....
Arizona	29	29	100.0	29	.....	.....	5	5	100.0	5	.....	.....
Arkansas	2,816	678	24.1	625	53	7.8	333	88	26.4	80	8	9.1
California	18,678	2,193	11.7	2,076	117	5.3	2,412	363	15.0	350	13	3.6
Colorado	867	172	19.8	158	14	8.1	68	49	72.1	47	2	4.1
Florida	128	117	91.4	116	1	0.9	18	15	83.3	15	.....	.....
Georgia	38	38	100.0	38	.....	.....	4	4	100.0	4	.....	.....
Illinois	28,997	5,355	18.5	5,007	348	6.5	2,717	676	24.9	653	23	3.4
Indiana	5,288	1,347	25.5	1,218	129	9.6	1,212	405	33.4	363	42	10.4
Iowa	17	17	100.0	17	.....	.....	.....	.....	.....	.....	.....	.....
Kansas	24,315	3,898	16.0	3,283	615	15.8	3,081	491	15.9	411	80	16.3
Kentucky	9,946	1,071	10.8	960	111	10.4	950	74	7.8	58	16	21.6
Louisiana	15,752	2,132	13.5	1,840	292	13.7	2,335	274	11.7	221	53	19.3
North Louisiana	8,012	1,163	14.5	1,074	89	7.7	1,428	141	9.9	124	17	12.1
South Louisiana	7,740	969	12.5	766	203	20.9	907	133	14.7	97	36	27.1
Maryland	3	3	100.0	3	.....	.....	1	1	100.0	.....	1	100.0
Michigan	10,441	2,957	28.3	2,742	215	7.3	901	321	35.6	300	21	6.5
Mississippi	2,506	821	32.8	789	32	3.9	337	121	35.9	114	7	5.8
Missouri	814	191	23 5	187	4	2.1	32	17	53.1	17	.....	.....
Montana	2,921	206	7.1	173	33	16.0	250	43	17.2	36	7	16.3
Nebraska	289	166	57.4	163	3	1.8	15	9	60.0	8	1	11.1
Nevada	1	1	100.0	1	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	1	1	100.0	1	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico	6,107	680	11.1	601	79	11.6	499	76	15.2	59	17	22.4
New York	13,950	46	0.3	45	1	2.2	936	.....	.....	.....	.....	.....
North Carolina	11	11	100.0	11	.....	.....	.....	.....	.....	.....	.....	.....
North Dakota	16	4	25.0	4	.....	.....	5	5	100.0	5	.....	.....
Ohio	14,133	329	2.3	287	42	12.8	1,028	32	3.1	32	.....	.....
Oklahoma	28,846	3,785	13.1	3,141	644	17.0	4,316	526	12.2	451	75	14.3
Oregon	4	4	100.0	4	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	44,738	62	0.1	36	26	41.9	1,962	4	0.2	2	2	50.0
South Carolina	4	4	100.0	4	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	17	16	94.1	16	.....	.....	6	6	100.0	6	.....	.....
Tennessee	374	175	46.8	161	14	8.0	43	33	76.7	31	2	6.1
Texas	109,263	16,390	15.0	14,437	1,953	11.9	13,895	2,841	20.4	2,376	465	16.4
Dist. 1: S. Central	3,431	1,379	40.2	1,312	67	4.9	554	250	45.1	234	16	6.4
Dist. 2: Middle Gulf	[1]	[1]	.....	[1]	[1]	.....	643	192	29.9	151	41	21.4
Dist. 3: Upper Gulf	11,035	1,764	16.0	1,543	221	12.5	1,387	278	20.0	238	40	14.4
Dist. 4: L. Gulf-S.W.	22,518	4,421	19.6	3,889	532	12.0	1,313	367	28.0	316	51	13.9
Dist. 5: East Central	[2]	[2]	.....	[2]	[2]	.....	195	78	40.5	74	4	5.1
Dist. 6: Northeast	11,954	1,399	11.7	1,303	96	6.9	883	90	10.2	74	16	17.8
Dist. 7-B: N. Central	[3]	[3]	.....	[3]	[3]	.....	1,887	662	35.1	532	130	19.6
Dist. 7-C: W. Central	[4]	[4]	.....	[4]	[4]	.....	491	134	27.3	109	25	18.7
Dist. 8: West	24,350	1,912	7.9	1,618	294	15.4	2,793	217	7.8	174	43	19.8
Dist. 9: North	29,836	5,414	18.1	4,679	735	13.6	2,652	565	21.3	467	98	17.3
Dist. 10: Panhandle	6,139	101	1.6	93	8	7.9	1,097	8	0.7	7	1	12.5
Utah	58	36	62.1	32	4	11.1	56	24	42.9	22	2	8.3
Virginia	37	6	16.2	4	2	33.3	1	1	100.0	1	.....	.....
Washington	23	23	100.0	23	.....	.....	1	1	100.0	1	.....	.....
West Virginia	9,679	65	0.7	43	22	33.8	499	16	3.2	5	11	68.8
Wyoming	2,154	308	14.3	238	70	22.7	598	146	24.4	128	18	12.3
Total United States	353,462	43,490	12.3	38,663	4,827	11.1	38,534	6,680	17.3	5,814	866	13.0

* Exclusive of all tests seeking new pay zones or outposts attempting to extend known fields.
[1] Dist. 2 included with Dist. 4. [2] Dist. 5 included with Dist. 6. [3] Dist. 7-B included with Dist 9. [4] Dist. 7-C included with Dist. 8.

West Texas Leads in Regional

GEOPHYSICAL ACTIVITY

OIL and gas prospecting activities were being conducted on a less extensive scale in the U. S. at the end of 1949 than a year previous. A total of 455 geophysical and core drilling crews were actively engaged in the search for favorable geological structures at the close of 1949, a decline of 104 from the 559 crews working at the end of 1948.

Both geophysical and core drill crews showed a decrease from year ago levels. Of the total of 455 crews working at the end of the past year, there were 429 geophysical crews and 26 core drill units. Geophysical crews were off 49 and core drill crews down 14 from year ago levels.

Seismic operations continued to account for most of the activity, totaling 365 at the end of 1949 in contrast with 427 at the close of 1948. There were 56 gravity meter crews working, which compared with 84 at the end of the previous year. Magnetometer crews totaled eight, the same number as were working the end of 1948.

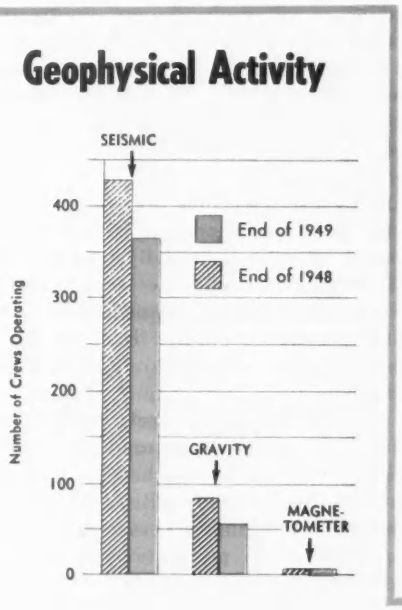
Texas was the most active state, having 147 geophysical crews and 8 core drilling crews for a total of 155. At the end of 1948 this state had 188 geophysical crews and five core drilling crews for a total of 193. West Texas was the most active region in the state, having 71 geophysical crews and 4 core drill crews. This represented an increase over year ago volumes, when this region had 69 crews, all geophysical, working. There were 67 seismic crews working in West Texas on the last day of the past year, in contrast with 57 the previous year. Southeast Texas followed in activity with 34 geophysical crews, 31 of which were of the seismic type.

Louisiana was the second most active state, having 76 prospecting crews at work compared with 103 at the end of 1948. The state had 63 seismic crews, 11 gravity units and 2 core drill crews working at the end of 1949.

Oklahoma had 34 crews working, a decline of 10. Of this number there was 1 core drill unit, 31 seismic and 2 gravity meter crews.

Montana was one of the few states to show an increase, having 21 geophysical crews working against 14 at the end of 1948.

Mississippi and Wyoming were other active regions. Mississippi had 33 geophysical and core drill units compared with 39 a year ago, while Wyoming had 33 geophysical crews against 57 at the end of 1948.



Geophysical and Core Drilling Activity at End of 1949 and 1948

(Figures represent number of crews. Source: Interstate Oil Compact Commission)

	Seismic		Gravity		Magnetometer		Total Geophysical		Core Drill		Total Geophysical and Core Drill	
STATE	1949	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949	1948
Alabama	1	3	1	2	..	..	2	5	..	3	2	8
Arkansas	7	10	1	1	1	..	9	11	..	3	9	14
California	14	15	2	3	1	1	17	19	..	..	17	19
Colorado	7	5	2	4	..	..	9	9	..	..	9	9
Florida	..	..	1	..	..	1	1	1	1	1	2	2
Georgia	..	1	..	..	..	..	..	1	..	1	..	2
Illinois	5	3	2	..	..	..	7	3	1	2	8	5
Indiana	..	1	..	..	..	1	..	2	4	..	4	2
Kansas	7	7	1	3	..	..	8	10	4	9	12	19
Louisiana (North)	18	19	6	3	..	..	24	22	2	2	26	24
Louisiana (South)	45	66	5	13	..	..	50	79	..	..	50	79
Michigan	..	..	..	..	..	..	..	..	..	6	..	6
Mississippi	23	27	4	6	1	2	28	35	5	4	33	39
Montana	16	10	5	4	..	..	21	14	..	..	21	14
Nebraska	5	..	..	..	..	..	5	..	..	..	5	..
New Mexico	17	17	2	3	..	..	19	20	..	..	19	20
New York	..	2	..	..	..	..	..	2	..	..	..	2
North Dakota	5	..	2	..	1	..	8	..	..	..	8	..
Oklahoma	31	38	2	2	..	..	33	40	1	4	34	44
Texas (East)	6	11	5	4	..	..	11	15	2	3	13	18
Texas ((Southeast)	31	43	3	11	..	1	34	55	..	..	34	55
Texas (Southwest)	27	45	4	4	..	..	31	49	2	2	33	51
Texas (West)	67	57	2	10	2	2	71	69	4	..	75	69
Utah	4	1	2	..	2	..	8	1	..	..	8	1
Wyoming	29	46	4	11	..	..	33	57	..	..	33	57
Total	365	427	56	84	8	8	429	519	26	40	455	559

West Texas Strike Highlights U. S. FIELD ACTIVITY

Impact of West Texas Find To Linger Throughout 1950

A drilling and lease play of such boom proportions that its impact will be felt during 1950 and subsequent years was unfolded in West Texas' Scurry and adjacent counties during 1949.

The productive limits of Scurry County's reef trend is destined to be materially enlarged. Bordering counties have scored new fields on the same geological strike, and it is reasonably certain that more important fields will occur as exploration of the Pennsylvanian reefs proceeds along a general north-south trend on the east side of the Permian Basin.

While the Pennsylvanian reef development accelerated in pace each month, the remainder of the district accounted for an exceptionally large quota of discoveries, new oil pays and major extensions the past year. The tendency toward outstanding strikes occurring in deep structures was less pronounced. More counties than usual shared in the discoveries.

Growth of Scurry County's Pennsylvanian productive areas during 1949 proceeded at an unprecedented rate for the district. At the start of the year the county's deep production consisted of a small flowing well completed by Sun Oil Company from the 6800-foot Canyon in July, 1948, as the discovery for the Schattel pool. Three nearby failures eliminted this area from further consideration.

Magnolia Petroleum Company's Winston 1, situated 3¾ miles east, passed up promising pay in the 6800-foot Canyon reef, and completed November 5, 1948, as a pumper from the 7400-foot Strawn. This lease was due to expire before the end of the month. The area was officially designated as the Kelly field.

The upturn in Scurry County's deep explorations occurred later in November when Standard Oil Company of Texas' Brown 1, Lease 2, opened the North Snyder field 12 miles north of the Kelly 1-well area with a natural flow from the Canyon reef at 6260-414 feet. In view of the company's large supporting lease block this Pennsylvanian area was not generally expected to expand beyond its acreage. Previous Pennsylvanian fields in the Permian Basin had proved to be comparatively small in area, and a large majority were disappointing in crude yield and productive area.

Conversion of Scurry County into a major sweet crude reserve progressed rapidly in 1949. At the close of the first week of the year Lion Oil Company completed McLaughlin 2 as the discovery for the Diamond M field from Canyon reef at 6569-6614 feet. This placed production near the west side of the county and 3½ miles northwest of the Schattel 1-well pool, nearest Pennsylvanian producing area. By mid-January Magnolia's H. G. Moore 1 enlarged the Kelly field 1⅞ miles northwest of its Strawn-pay discovery, by completing the first Canyon reef producer at 6845-65 feet.

Exploration of the reef on the west side of the county accounted for another sector early in March when Humble Oil & Refining Company's Bishop 1 opened the Sharon Ridge-Canyon field from prolific Canyon perforations at 6650-79 feet. An interval of three miles separated this strike from the Diamond M field to the north, but the gap has since been shortened and will be closed by continuous production.

The advance of the North Snyder field towards the Kelly area occurred in long extensions. Sunray Oil Corporation-Ryan-Hays and Burke's Brown 1 moved Canyon production 2¼ miles south in April. W. A. Moncrief-Bob Hope-Bing Crosby and Paul Teas combined in drilling a 1⅜-mile outpost in August, while the two areas were linked two months later by Standard-Fryer Drilling Company et al's Wilkinson 1, situated 2⅓ miles southwest of nearest North Snyder production and three miles northwest of Kelly-Canyon production. The linking of the Kelly and Diamond M Canyon areas was accomplished by a series of outpost tests, with Newman Brothers Drilling Company - Alaska Steamship Company and Calvert Corporation accounting for two, while S. B. Roberts et al filled in between the latter two.

Between 45,000 and 50,000 acres of Pennsylvanian producing area was confirmed for Scurry County during 1949 through the linking of the established areas and the newer strikes. The quota of dry holes exacted in the effort proved negligible. Pay thickness and ability to produce varies considerably over this expansive area, but the entire acreage qualifies as being commercially productive. The North Snyder sector affords the greatest reef development above the oil-water contact. The presence of from 300 to 500 feet of broken pay section is common-place. A single well on the east edge of the field has an estimated 768-foot section of broken pay from top of the Canyon reef to the assumed water table, although it only penetrated 608 feet of the reef.

Other Scurry County developments during 1949 included the opening of three widely separated Ellenburger pools; and a pumping Mississippian discovery. Oil production from the Strawn was developed on the east side of the North Snyder area, but outside the Canyon producing contour. Oil flow from the Strawn was developed on the southeast side of the Kelly field, while the Diamond M field listed pumping production from the 3200-foot Clear Fork.

Continuation of the Canyon reef production along a north by east trend from the North Snyder area into Kent County for an eight-mile expansion appeared likely at the close of the year. J. A. Chapman Producing Company's Cogdell 1, near the south line of Kent County, created this possibility in making a flowing well from Canyon reef at 6800-57 feet. This zone falls within the producing contour of the nearest field wells. An aggressive exploratory campaign is getting under way along the reef trend through Kent County and into counties beyond.

Borden County accounted for 2 Pennsylvanian reef discoveries, 2 unimportant Lower Permian strikes, and a Silurian flowing discovery, which was later discounted by offset failures. The 8100-foot Pennsylvanian reef strike in the Good area is a substantial addition to crude reserves, but probably small in area. Amerada Petroleum Corporation's Von Roeder 1, near the east edge of the county and four miles west by south of the Sharon Ridge-Canyon field, may prove to be a continuation of the Scurry County reef trend. Relationship of this

discovery to the nearby field is complicated due to completion being made at 7100-10 feet, and below the first water in the Canyon series. The upper section also showed possible production. Scurry County operators are impressed by the ability of this well to produce from the Canyon above and below the first water table.

A similar situation for the same general area arose when Standard of Texas' Dunn 1, Northwestern Mitchell County wildcat and nine miles south by west of the Sharon Ridge-Canyon field, developed flowing production from perforations at 7565-83 feet in Canyon, topped at 7380 feet. Water trouble developed later, and the well will be reworked. Mitchell County listed its first Ellenburger strike with the completion of Superior Oil Company's Dockery 1, and the company's second well advanced production 1¾ miles northeast.

Outstanding discoveries in the Central Platform and Midland Basin sectors of West Texas consisted of the Pegasus multi-pay deep field, centering upon the Upton-Midland County line; and the Flanagan multi-pay field, Gaines County. Nearby Doss and Robertson fields added new pays from the Canyon and Devonian-Ellenburger zones, respectively. The Spraberry sand zone of the middle Permian made progress in becoming an important source of production and future development in Dawson and Midland counties.

A rival for Scurry County in proving a large area for future development involves the spread of the Clear Fork "5600" pay on the south and southwest flanks of the Goldsmith field, Ector County. More than 100 wells are to be drilled in this area as result of a three-mile south extension by Ed. C. Lawson et al's Barrow 1, and an equally important extension to the southwest of the main field by Forest Oil Corporation.

New Mexico Deep Discoveries Assure Heavy Development

Deep prospecting in Lea County sector of New Mexico accounted for an impressive list of oil discoveries that will result in considerable drilling before these new areas are fully developed. Other than a pending 7600-foot Dakota sand pumping discovery in Rio Arriba County, oil development in the remainder of the state was uneventful. An isolated wildcat in Chaves County was awaiting final completion as a small gasser.

Seven of the new oil fields uncovered in Lea County produce below the 9400-foot level, and others have additional pays that will result in the drilling of twin wells.

Two significant oil strikes were made in the west portion of Lea County by Amerada Petroleum Corporation. The Bagley area was proved for flush production from the Siluro/Devonian at 10,965 feet, and the 9000-foot Pennsylvanian became an extra source of sweet crude. The company opened the Hightower area 3½ miles south flowing 57-gravity oil from the 10,100-foot Devonian. Expiring leases require considerable development in both areas. A third deep strike by the company involved the discovery of the Knowles field from the 12,600-foot Devonian in the east portion of the county.

A large producing area is expected to result from the discovery of the Denton 11,400-foot Devonian field by McAlester Fuel Company. An east outpost has confirmed the area for 11,300-foot Mississippian oil flow. Short term leases are a factor in speeding up development.

An expansive oil area is in prospect for the Bough field, where the 9600-foot Pennsylvanian yields flowing production. This formation was also confirmed for production in the nearby Cross Roads field.

Activity within and adjacent to the older producing sectors of the county resulted in the opening of the 7000-foot House field, which promises to expand into a sizeable area. The addition of the North Drinkard 6700-foot Yeso oil area was followed by competitive drilling that has not run its course. The southeast portion of the county listed a productive Ellenburger strike at 9700 feet by Stanolind Oil & Gas Company, which also proved the depleted Dublin area for a small Devonian producer at 9500 feet.

Texas Panhandle Advances Deep-Production Campaign

The anticipated deep-production campaign in the Texas Panhandle made definite progress during the past year, but adverse developments checked the momentum and enthusiasm of the participating companies and operators.

The Anadarko Basin sector of the district confirmed the presence of deep production in listing a flowing oil completion from the 8900-foot Mississippian that was carried over from the previous year in order to test lower zones. The district listed its first high-pressure sweet gas strikes from the Pennsylvanian, and an oil strike from the latter is awaiting completion.

Failure of the Mississippian oil strike made by Sinclair Oil & Gas Company on the Lips prospect, Roberts County, to maintain its steady flow after completing in April as the first deep discovery for the district caused the cancellation of an ambitious drilling program on nearby acreage. A crude transportation and market problem arose when it developed that this 35-gravity sweet crude congeals at 82° F. The company's confirmation test, situated a mile northwest, missed the oil zone, but plugged back for completion as a 41 million cubic foot sweet gasser from Pennsylvanian at 8110-65 feet, thereby confirming the presence of an important high-pressure gas reserve that will eventually be utilized in supplying the numerous gas transmission lines extending from the district.

The district's deep producing gas reserve outlook was further enhanced in May when Phillips Petroleum Company's M. J. Boney-Katheryn 1-A, southeastern Sherman County, recorded a potential of 19,350,000 cubic feet of sweet gas daily from Pennsylvanian perforations at 5312-425 feet after plugging back from granite. A maximum flow of 2,700,000 cubic feet of gas daily was developed from perforations at 6050-6080 feet, but excluded to complete from the higher and more productive zone.

Phillips Petroleum Company's Williams-Willclo 1, two miles southeast and lower structurally than its Sherman County gas discovery, missed the Pennsylvanian gas in drilling to 6464 feet. The hole was plugged back, and is in process of completion as a 39-gravity oil pumper from perforations at 5844-80 feet.

North, West Central Texas Areas to Be Highly Active

New fields and extensions tapped in 1949 have stimulated prospecting in North Central and West Central Texas to an extent that the area will be among the most active in the state this year.

Deep Pennsylvanian and Mississippian zones accounted for the bulk of the discoveries and new pays. Large-scale employment of geophysical crews for detailing small structures resulted in an unusual number of oil and gas discoveries from these zones in Throckmorton, Stephens and Shackelford counties. All are comparatively small in productive area. Development is conducted cautiously because of the dry hole hazards. Jones, Taylor, Coleman and Haskell counties contributed their usual large volume of shallow and semi-shallow oil discoveries.

Enlargement of the North Central Texas district's deep production borders made progress through the discovery of oil and gas areas in Comanche, Erath, Parker, Nolan and Fisher counties. Opening of the Pardue multi-pay oil area in northeastern Fisher County was a standout development, while the nearby Round Top multi-pay field registered a steady expansion. Both produce from reef-type structures. Nolan County listed a Strawn and Ellenburger strike to shorten the interval of non-productive territory between this and the West Texas district.

Deep Production Replacing Shallow Pay in North Texas

North Texas exceeded its normal annual volume of discoveries and new oil pays during 1949. Majority of these strikes occurred in deep Pennsylvanian, Mississippian and Ellenburger zones that are steadily replacing the shallow fields as the district's main source of oil production for the future.

Preliminary appraisal of these new fields indicates that none are likely to expand into large producing areas. Nearly all are adjacent to established fields, or within clusters of dry holes. Even though small in area each new strike will attract followup developments that will give the district a large backlog of future drilling in the aggregate.

Ability to uncover new fields in partially condemned areas emphasizes the degree of efficiency in applying subsurface geology and geophysics. This combination of effort was particularly effective in Archer, Clay, Jack, Montague, Cooke and Young counties. The practice will continue indefinitely if crude prices remain at a favorable level.

Eastern Jack County was a major contributor of new deep fields and additions to productive areas. Exploratory work was stimulated through an overlapping play stirred up by the expansion of Wise County's Chico district fields into a large Bend conglomerate oil and gas area.

Major Development Unlikely In New East Texas Areas

New producing areas registered by East Texas were above normal in volume for the year, but a preliminary appraisal discounts the possibiilty of any of these strikes being expanded into important reserves.

Majority of the oil discoveries yield low-gravity crude in line with a trend that has been evident for several years in the district. This type of crude is nearing the saturation point in market demand and transportation facilities available, so development of the heavy-oil producing areas is generally on a restricted basis.

The 19-year-old East Texas field was a big contributor of new wells from its regular Woodbine pay during the past year as a result of relaxation of well-spacing restrictions. New wells were added at about the same rate as wells were plugged in the water-flooded sectors of the giant field. Productive area of the field is steadily shrinking as the water table advances from the west and northwest. The new wells are within the field's limits established some years previous, and serve to equalize drainage with adjacent leases. This inside drilling of wells will continue at a substantial rate during the current year.

Opening of five oil areas in Wood County from the sub-Clarksville sand assures this county a long-range drilling program in developing and defining these new fields. The discoveries involve faulted structures that generally are extremely narrow. Occasionally the underlying Woodbine sand also yields oil in localized areas, so some of the new strikes may attain greater significance as development proceeds. Wood County exploration along known fault trends has been highly successful, and more fields will likely be found as wildcatting progresses beyond discoveries made the past year. The county has paced the district in volume of wildcatting and field operations, excepting the East Texas field, for several years. It will retain this position indefinitely.

Deep prospecting uncovered the Tennessee Colony field, Anderson County, and the Red Springs field, Smith County. Both have flowing high-gravity oil production from the Upper Rodessa, and gas-condensate from the Lower Rodessa. The extent of their productive area is speculative. Deep gas discoveries were recorded in Nacogdoches, Harrison, Panola and Freestone counties. The Stewards Mill field in the latter county added the Pettit as a source of gas-condensate production.

South Texas Gas Discoveries To Be Developed This Year

Numerous South Texas discoveries in 1949 foretell much development in 1950, particularly of gas reserves.

There was quantity, if not quality, in discoveries in this area during 1949. The strikes ranged from grass roots to 10,000 feet, though most were from 4000 to 8000 feet, which are attractive depths for immediate development.

Pacing the new discoveries was Duval County with Starr, Nueces and Goliad counties following. The three-county region of Victoria, Lavaca and Calhoun also was the scene of new development.

Shallowest strike was the discovery of oil in the Staples area of Caldwell County at 670 feet. A well near Lund, Travis County, also yielded oil from 980 feet.

Deepest discovery was made by Quintana Petroleum Company in San Patricio County, where a gas well was completed at 9984 feet.

Probably the most important development during the year was Humble Oil & Refining Company's continued successful wildcat campaign on the King Ranch in Brooks, Kenedy and Kleberg counties. Numerous new oil and gas discoveries were made by Humble as well as the discovery of new producing zones in known fields.

In Duval County, nine oil pools were opened and seven gas reserves. Drilling in this county is comparatively shallow and the pools are quickly developed and do not cover much acreage.

Goliad County, almost a newcomer to the oil producing column, was the scene of much development. However, most of the discoveries were confined to the gas-condensate class. Production is from the Yegua and Wilcox zones.

Drilling in the La Copita pool paced developments in Starr County. Six new sands yielded oil during the year. They ranged in depth from 4844 to 6834 feet. Four oil pools and two gas fields were uncovered.

A major discovery for the Rio Grande Valley was made in the La Sal Vieja area in Willacy County by J. S. Abercrombie Company. The discovery well flowed oil from 8329-44 feet.

Heavy Drilling Expected on Flanks of Texas Coast Domes

Drilling success in 1949 along the flanks of established salt domes will cause brisk exploration of this variety on the Texas Gulf Coast during 1950.

This dome flank drilling helped make 1949 probably the most successful post-war year in the discovery of more oil and gas reserves. Wildcatting brought results in almost every county in the area, with most of the success concentrated along the Wilcox trend.

The old year also saw the first successful completion of a producing well in the Texas tidelands. Stanolind, Melben and Ohio No. 1 State, lease 31700, 18 miles southwest of Galveston, flowed gas and condensate from 5964 feet.

However, a second test drilled from the same platform was abandoned as dry below 10,000 feet, and it is doubtful if the companies will push their exploration in the Gulf.

Discoveries of gas reserves paced all exploration work in this area. No less than 25 pools were found.

Classed as the major oil discovery of the year is Houston Oil Company of Texas' and American Republics Corporation's strike in the East Village Mills area, Hardin County.

The operators' Nona Fletcher Lumber Company was completed in the Wilcox sand at 7058-66 feet. The pool has been steadily developed by the discoverers and Humble Oil & Refining Company. At the end of the year, the pool had 17 producers and one dry hole had been drilled.

The discovery well also showed production from the Yegua which may lead to multiple-zone production.

Although gas and condensate production already had been uncovered in the New Ulm area of Austin County, McCarthy Oil and Gas Corporation opened oil production in the sector when Schiller 1 flowed from 9467-85 feet. A confirmation well now is being drilled.

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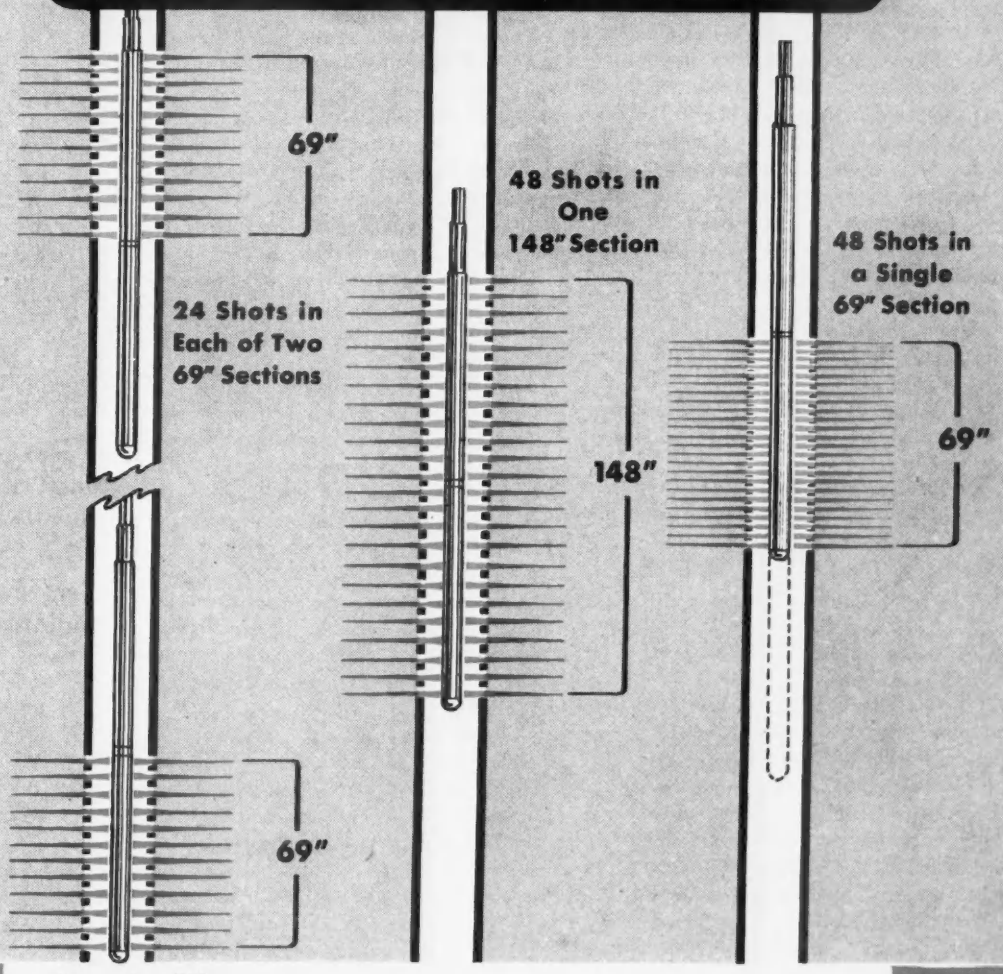

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Dome, Jefferson County, Bering Company and J. C. Wynne completed Mary E. Fitzhugh 1-A at 4980-86 feet. A second oil producer was completed at 4670-4675 feet.

The first discovery for Grimes County was made by E. G. Goforth of Houston. The operator's Fee 1, Todd area, flowed about 3 million cubic feet of gas daily and some condensate at 7604-10 feet.

One of the most widely developed areas during the year was the southeast segment of the South Gillock field, Galveston County, by Pan American Production Company.

South Louisiana Tidelands To Get Major Development

Continued development of tidelands and major inshore discoveries is paramount in plans of operators active in South Louisiana.

Fifteen discoveries, including new pay sands, were made in the Gulf during 1949.

Deepest discovery for South Louisiana was the opening of an oil sand at 14,-015-25 feet in the Weeks Island field, Iberia Parish, by Shell Oil Company.

An important shallow discovery was of a gas field opened at 2169-82 feet by Humble Oil & Refining Company at Pelican Island, Plaquemines Parish.

Principal development in the Gulf was by The California Company in the Bay Marchand area off the coast of Lafourche Parish. The discovery well was completed in Block 2 at 2873-92 feet. However, new sands were developed during the year at 3900-25, 5020-66 and 5048-92 feet.

The area in the Gulf off Cameron Parish also yielded two oil pools and one gas pool.

Kerr-McGee Oil Industries, Inc., discovered oil in Block 33 at 10,390-408 feet. Stanolind Oil & Gas Company opened the Block 45 pool with oil production at 8738-48 feet.

A gas and condensate strike was made by The Superior Oil Company at 7150-60 feet.

Gas was discovered by Magnolia Petroleum Company in Block 110 off Iberia Parish at 9970-72 feet.

New oil sands were opened by Humble in the Caminada Pass and Grand Isle Block 18 pools off Jefferson Parish.

Barnsdall Oil Company found oil in a wildcat drilled in Breton Sound Block 32, Plaquemines Parish, at 5802-04 feet.

The Texas Company has developed a major oil field in the Fordoche area of Pointe Coupee Parish. The company's Joseph Oscar Long et al 1, opened the field by flowing from 8282-90 feet. The next three tests drilled by the company found new oil sands.

Wilcox sand production at 5500 feet was discovered by Union Producing Company and M. H. Marr in the Big Island area of Rapides Parish. Production has been confirmed with a second producer and development is continuing.

Extension of Smackover Is Major North Louisiana Goal

Attempts to extend Smackover lime production from North Louisiana into Arkansas promise the most important exploration work for the year in North Louisiana.

Late in 1949, Hunt Oil Company completed S. W. Owens 2, 12-23-7w, Claiborne Parish, to extend Smackover pay in the East Haynesville field about 2¾ miles northeast and nearer the Arkansas line.

On the last day of the old year Hunt, trying to extend the prolific deep lime pay even farther north and closer to Arkansas, spotted a Smackover lime wildcat, Leroy Ware 1, in 7-23-6w.

This extension overshadowed the discovery of two fields in the Shreveport area. One was the Dykesville in Webster Parish near Haynesville, discovered by Barnsdall Oil Company.

The other field was the South Sarepta, Bossier Parish, discovered by Bransdall, Sohio Petroleum Company & G. H. Murphy's Ardis 1, 27-22-11w.

Another Smackover completion near the Arkansas line was in Union Parish near the small town of Randolph. The well is the Zach Brooks Drilling Company's Mrs. Dora Nelson 1, 29-23-3w.

Opening of two fields in Concordia Parish, near the Mississippi border, will give impetus to further exploratory drilling in that area.

Last of the two areas opened was the Vidalia, and two tests are already going down. Production is from the Wilcox.

Preceding discovery of the Vidalis field was the finding of the Chaney lakes field by Gulf Refining Company and Hunt Oil Company. Producing zone was also the Wilcox.

Most active spot in the northern part of the state has been the West Catahoula lake field of La Salle Parish. Presently, there are eight locations in the field, all by H. L. Hunt Company.

Another area which may come into the limelight for exploratory drilling is Barksdale field. A hearing was held in September on the possibility of drilling to protect the government from drainage by wells on adjacent land without interfering with the primary mission of the air base.

Impetus to such a plan was boosted again during 1949 by the completion of wells just outside the limits of Bossier City and near the base in what is known as the Shreveport extension area.

First well was the McAlester Fuel Company's Waller Estate A-1, in 27-18-13w. Then a well directly south of it was completed and now one west of it has been brought in. There are now two locations in the area. All the wells are producing from the Pettit lime around 5550 feet.

Arkansas Exploration Due To Continue Rapid Pace

Exploration in Arkansas is expected to continue in 1950 at about the same heavy pace maintained during 1949.

Arkansas reported the first major discovery in the Shreveport area for the year with opening of the Pine Tree field, Columbia County, by Lion Oil Company's Story in 29-18s-19w.

Three other discoveries in Arkansas during 1949 were the Spotville field in Columbia by McAlester Fuel Company and Curtis Kinards T. O. Giles Estate A-1 in 6-18s-18w; Curry field in Ouachita by Burnett Drilling Company's Kate Curry in 5-15s-19w; and Loutre Creek in Union by MacMillan Petroleum, Marine Oil Company and Zach Brooks Drilling Company's Cleg Nash et al, in 35-18s-15w.

Columbia and Union counties will continue to pace the state in deep wildcat tests.

From the current trend it appears that the Smackover will gain the greatest play of any of the zones. Smackover pay is usually obtained around 8000 feet in this area.

Farther north in Arkansas there may be extensive drilling for gas, as no other wells have been completed in the two gas fields discovered in 1949.

Largest of the two discovery wells was the Arkansas Louisiana Gas Company's Ralph Barton in 27-9n-28w, Franklin County, which opened the Cecil field. Potential was 7 million cubic feet daily.

The other gas field found was the Rudy in Crawford County, opened by Sher Development Inc's Mrs. Ethel Hicks 1, in 31-10n-31w.

Year-End Spurt in Activity Maintained in Mississippi

A year-end spurt in wildcat activity, made in the face of numerous disappointments, seemed likely to carry over into the new year in Mississippi.

Noteworthy in stimulating exploration was the discovery by Red Wing Drilling Company of the seventh strike of the year at Smith 1, six miles north of Laurel, Jones County. Initial potential was 2,320,000 cubic feet of gas and about 11 barrels of condensate daily from the Eutaw at 5505-40 feet.

Several new wildcats staked late in the year included Danciger Oil and Refining Company's Jefferson County test, which was headed for 10,200 feet.

Big Chief Drilling Company and others opened a field in Lincoln County with Zeigler 1, which flowed 375 barrels of oil daily on test. Nearest production was

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The first SPI taken on September 24, 1940, was .00789. On August 19, 1947, the SPI was .00294. In 83 months it had declined to 37% of its original. Total production was 487,500 bbls., a monthly average of 5875 bbls., an increase of 2590 bbls. every month over Well A.

These two offsets, drilled on a California lease in 1940 by a major oil company, were similar in every detail. They were drilled to the same reservoir within a few hundred yards of each other. Their logs and cores showed a close relationship from top to bottom. Only on one known factor did they differ: Well A was completed with a water base mud while Well B was completed with an oil base mud.*

NOTE THE SIMILARITY OF THESE OFFSET WELLS

	WELL A	WELL B
Sand Thickness	180 ft.	190 ft.
Average Sand Permeability	115 md.	105 md.
Static Pressure	3135 psi	3100 psi
Millidarcy feet of sand	20,700	19,950

* The oil base mud used in this well contained air-blown asphalt and was mixed with a refined type oil. After several improvements this mud became known as Black Magic.

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These wells were produced under proration conditions and represent normal depletion practices. In spite of the fact that Well A flowed an average of 3285 bbls. monthly, it still was producing far below its ultimate potential due to Jamin action (water blocking), the result of drilling into the production zone with water base muds. The difference in the size of Wells A and B proves beyond question that water blocking damages a well permanently, hastens the day it will be shut down.

Black Magic with a filtrate loss of zero cannot possibly mud off or water block the oil sands. Black Magic deposits a thin mud cake that readily disintegrates when displaced by crude. It helps instead of hinders production and on occasion has made commercial producers out of dry holes. For full information write for paper "What Happens Tomorrow?"

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the Mallalieu field, 2½ miles northwest.

A Stanolind Oil & Gas Company test in Jefferson County tapped the Tuscaloosa for 17 barrels of 36.7 gravity oil per hour.

Largest producer of the year was The California Company's Bass Unit 1, Bude field, Franklin County. The test flowed 604 barrels of 43.8-gravity oil in 24 hours to revive interest in the field which had lagged with the completion of several dry holes since its discovery in February.

Oklahoma Operators Expect Year of Heavy Development

Oklahoma producers were optimistic about 1950 as they looked back on a year that saw pool development reach a new high with intensive work centering on the Golden Trend area of southern Oklahoma and in the new Elk City pool in the western section of the state.

At year's end the Golden Trend region had been proven for 25 miles in a northwest-southeast direction comprising a series of oil pools of varying size, but all representing impressive reserves. Another interesting development was chalked up in the Ringwood pool of Major County, along the northern rim of the Anadarko Basin with more than a score of wells producing from Pennsylvania sands.

Some of the outstanding pool openers in Oklahoma during 1949 included Mid-Continent Petroleum Corporation's Wilcox sand strike in Grant County, NE NE NE 1-25n-5w, flowing 1200 barrels of oil per day on initial test from 5817-48 feet. Gulf Oil Corporation et al opened the Pecan Grove pool in Hughes County from the Cromwell section at 3320-45 feet. The well gauged 8 million cubic feet of gas and 12 barrels of condensate daily.

In the old Okfuskee County region, scene of some of the state's earliest discoveries, Falcon-Seaboard Drilling Company registered a spectacular strike in SE SE SW 14-13n-8e, where a wildcat surrounded by dry holes hit pay in the Cromwell at 3936-45 feet to produce on initial test about 250 barrels of oil daily. Another old area which reported an extension was in the Broken Arrow district in southern Tulsa County where a shallow Dutcher sand test produced 35 barrels of oil daily. These and similar ventures in the old area such as Creek, Seminole, Okmulgee and Tulsa counties, witnessed a re-activation of effort with unusual success.

In Garvin County, scene of extensive development during the past two years, Davon Oil Company opened the South Panther Creek pool and Max L. Pray gave the state the Southeast Lindsay pool. In Garvin, Stephens and Carter counties operators and drilling contractors had the heaviest concentration of tools running in the state with a vigorous drilling program predicted at year's end and certain to carry through 1950.

To the north of Garvin and in McClain County where The Carter Oil Company's initial deep tests four years ago sparked the activity which eventually opened up the Golden Trend area, Cities Service Oil Company opened the East Bradley pool in 29-5n-4w with Dacus 1, which flowed from the Bromide at 11,180-368 feet for 110 barrels of oil daily.

Operators seemed content in 1949 to test shallow zones with 5000 feet as the average depth in the more active areas. However, W. O. Allen of Tulsa announced a projected 14,000-foot test in Ellis County in the western reaches of the state, following an intensive leasing campaign. Shell Oil Company's success in the Elk City pool is believed to have set the stage for a number of exceptionally deep wells in Western Oklahoma during the coming year.

Huaoton Field May Repeat As Brightest Spot in Kansas

Hugoton gas field was the industry's bright spot in Kansas during 1949 and is likely to repeat in 1950.

There, gas sales totaled approximately 260 trillion feet with a cash value of approximately $16 million for a 21 percent increase over the previous year. As in Oklahoma, the Hugoton producers and carriers experienced a crisis in wellhead prices when the Kansas regulatory body issued an order early in 1949 setting a minimum field price of 8 cents per thousand cubic feet for Hugoton gas. This was contested by transmission companies, who lost the first bout but carried their case to the Kansas Supreme Court.

Kansas, like other Mid-Continent oil producing states, met the oil import threat by curtailing production. This was a hard blow for the independents, who drilled most of the wells.

The Carter Oil Company sparked exploration throughout northeast Kansas with its strike in the Forest City Basin side of the Nemaha Uplift to open new production in Waubaunsee County. In this area, where about 45 dry holes had been drilled during the past few years, Carter opened the Davis Ranch pool which, at year's end, had nine producers, each rated at maximum producing capacity of 3000 barrels.

Among the more outstanding field developments during 1949 were the Borland field operations in southern Rooks County and along the central-northwest portion of the Central Kansas Uplift.

Farther north, B. & R. Drilling Company, Inc., et al's Huffstutter 1, opened the Huffstutter pool with a test which produced 100 barrels of oil per day in the Lansing-Kansas City lime. A few miles south of the Nebraska line the field marks the northwest production boundary along the Uplift and has played an important role in focusing attention to possible developments farther north.

Illinois Exploratory Drilling May Exceed Activity of 1949

If price structures remain normal and possible coal shortages do not reduce steel production, exploratory drilling in Illinois should equal or exceed the rate established in 1949.

Probably outstanding among 1949 developments were discoveries in Wayne, Marion and Fayette counties. All hold promise that similar finds will be made during the next 12 months.

In Wayne County, Illinois Mid-Continent and Aurora Gasoline Company's Richardson 1, 9-1n-5e, opened the South Zenith pool with initial production of 675 barrels of oil daily from McClosky lime at 3000-10 feet.

In Marion County, The Texas Company's Franke-Mayer 1, 3-1n-1e, opened the multiple-pay Raccoon Lake pool. The discovery was completed in Rosiclare and McClosky for 215 barrels. Since the discovery triple production has been found with Cypress pay.

In Fayette County, W. L. Beldon's Grames 1 was the first of three extensions of the Loudon pool.

Exploration in Indiana Due To Keep Pace With Old Year's

Indiana had an excellent year for discoveries and indications are that exploratory work will remain on a level with last year.

Here again price structure will have a bearing as it does in Illinois and the Western Kentucky area. However, production is not restricted in the Tri-State area and this will be a boon to drilling for new fields.

Two outstanding discoveries in 1949 were the Marts pool in Sullivan County and the Black Hawk pool in Vigo County.

Dome Gas Company's Bollinger 1 initialed only 50 barrels per day to open the Marts pool, but production was from the Devonian lime topped at 2080 feet. Other wells drilled in the pool later were much better producers and the area is still active. It led to greater interest in Devonian possibilities in the state and much work in the lime is anticipated this year.

Gwilliam Drilling Company's Hunkwork initialed 100 barrels daily in Devonian lime at 1845-75 to open the Black Hawk pool and give Devonian drilling another boost in the state.

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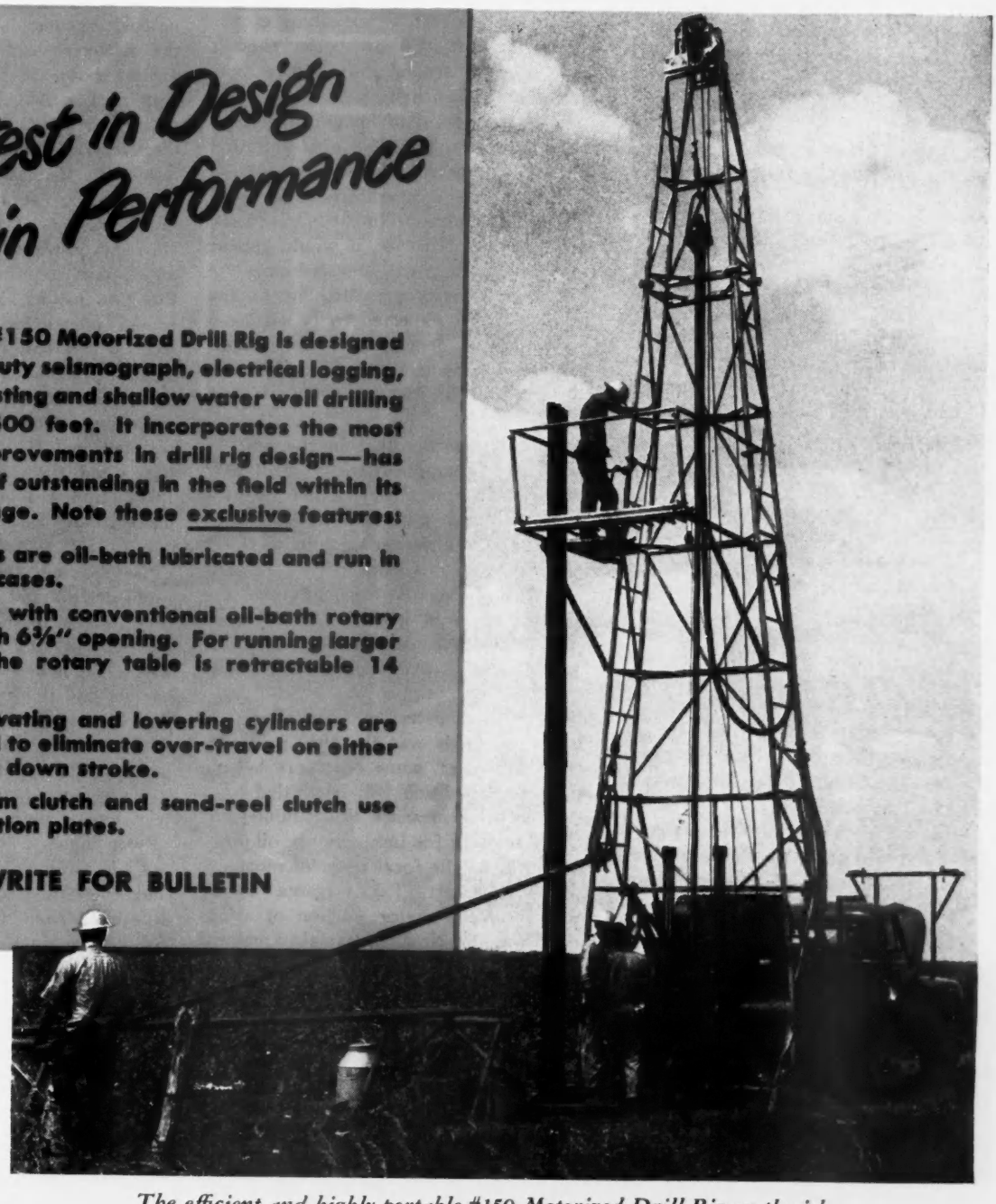

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Kentucky Expects Good Year As Fuel Demand Sharpens

The factors which may effect exploratory drilling in Western Kentucky are the same as in Illinois and Indiana.

Kentucky, extremely coal conscious, looks forward to a good year in drilling as the demand for oil fuel increases with the coal shortage.

One of the most important discoveries of 1949 was the East Caney-Mound pool. Delta Drilling Company's Walker 1, Union County, opened the area with a McClosky lime well which initialed 370 barrels per day at a depth of 2510-20 feet.

Decline in Ohio Exploratory Drilling Is Probable for 1950

A decline in Ohio drilling is probable during 1950. Although there are large unexplored areas in the state, particularly in the deeper sands, there is little to encourage much drilling, as it is expected that should these areas be productive it would be of gas. The price differential favors oil, and there is enough undrilled oil acreage to last for several years.

A wildcat in Erie County found a small amount of oil in the Trenton limestone and two wells, one mile and two miles west, have been started. A small pool was found in eastern Vinton County, but production is too small to cause much drilling.

A gas pool, discovered in southwestern Lorain County, is showing promise of being of some extent and will be developed this year. An encouraging gas well near Ravenna in Portage County was brought in near the end of the year and should be the cause of some development.

The Pennsylvania grade areas of Perry County and the Corning Grade areas of Licking and Knox Counties will continue to be, for this year, the most active in the state.

Michigan Exploratory Work Due to Maintain Same Rate

Exploratory drilling in Michigan should continue through 1950 at the relatively same rate as last year. None of the 1949 discoveries indicates large reserves. Independent drilling which makes up a fairly high proportion of wildcat work in the state will be influenced by crude prices. Present prices have encouraged exploratory work in areas not expected to deliver big reserves but a down movement of prices could seriously disturb such activities.

Development the past year produced a number of small fields, most of which are relatively near older fields.

Chief interest of the year centered on new developments in the 5000-foot Richfield horizon in Gladwin, Bay and Ogemaw counties. Eight wells ranging in potential from 100 to 1500 barrels per day were developed in the South Adams field from the Richfield section but the productive area probably is limited to parts of four sections.

Californians Take Cautious View of Prospects for 1950

California operators are taking a cautious view of 1950 prospects, though 1949 was the second most active year in the state's oil history.

Over-production of heavy oil and, to a lesser extent, light oil, plus agitation for a state control law or conservation act have caused operators to be conservative on new drilling commitments.

In general, however, it would appear that wildcatting will approximate the 1949 rate. Development drilling, on the other hand, is expected to be off by 5 to 40 percent, depending upon the individual company situation. Total number of new wells in 1950 may be off from 15 to 25 percent.

It is noteworthy that in the first 15 days of 1950, applications to drill new wells in California were down 51 percent from the same period last year. Re-drilling and deepening jobs were off 58 percent for the same period.

Heavy oil fields are suffering the most drastic cut back in development work. However, despite heavy shutins during 1949, inventories of all oils soared.

A further deterrent to drilling in heavy oil fields was the 1949 price decline. However, some operators believe the price condition will be settled by a state control measure this summer.

Wildcatting for light gravity oil probably will be the focal point of most exploratory effort. The Cuyama Valley will receive a major portion of attention, and the Newhall-Castaic area will come in for a number of deep tests. The San Ardo area, which was so active in 1948, will be touched only lightly in 1950 because of the low gravity of oil in the district. The San Ardo field itself is shut in.

One new area which may see some wildcatting is the Santa Cruz district of northern California. During the past six months considerable leasing has been going on and several companies are expected to start drilling soon.

With one exception 1949 discoveries were small and the over-all reserve picture declined. Most important find, and one which accounted for about one-half of the new reserves, was the South Cuyama field, Santa Barbara County. This field was tapped by Richfield Oil Corporation's Homan 81-35 with initial flow rate of 5008 barrels daily of 34.2-gravity oil. Considerable development work followed and by year's end 45 wells had been completed and it was estimated that about 3000 acres would be productive. Oil reserves in the field are now estimated at 125-150 million barrels. Richfield controls 70 to 80 percent of the proven acreage and The Superior Oil Company, Bell Corporation and Wilshire Oil Company the remainder.

Most spectacular development was the discovery and subsequent town lot drilling boom in the Placerita Canyon field of Los Angeles County, about 30 miles northeast of Los Angeles. The discovery was made in March by Ramon Somovia's Juanita 1, which was capable of producing about 1500 barrels daily of 25-gravity oil from 1900 feet. This started a townlot drilling campaign on an 80-acre townsite. Drilling was further intensified when the California courts overthrew the "Well Spacing Act" which had required one acre for a drill site. Wells were subsequently drilled on lots 35 by 127 feet.

Drilling that followed the court ruling resulted in 171 wells for the field at year's end, with 155 in the townlot area. Production reached a peak of 34,500 barrels daily in September for an average of 580 barrels per day per well. Close spacing, however, brought on a rapid decline and at the end of January there were 182 wells pumping 25,000 barrels daily for an average of 137 per well. The field has yielded 5½ million barrels and it is estimated that 10 million barrels remain. Total area of the field probably will not exceed 200 acres and may be as little as 160 acres.

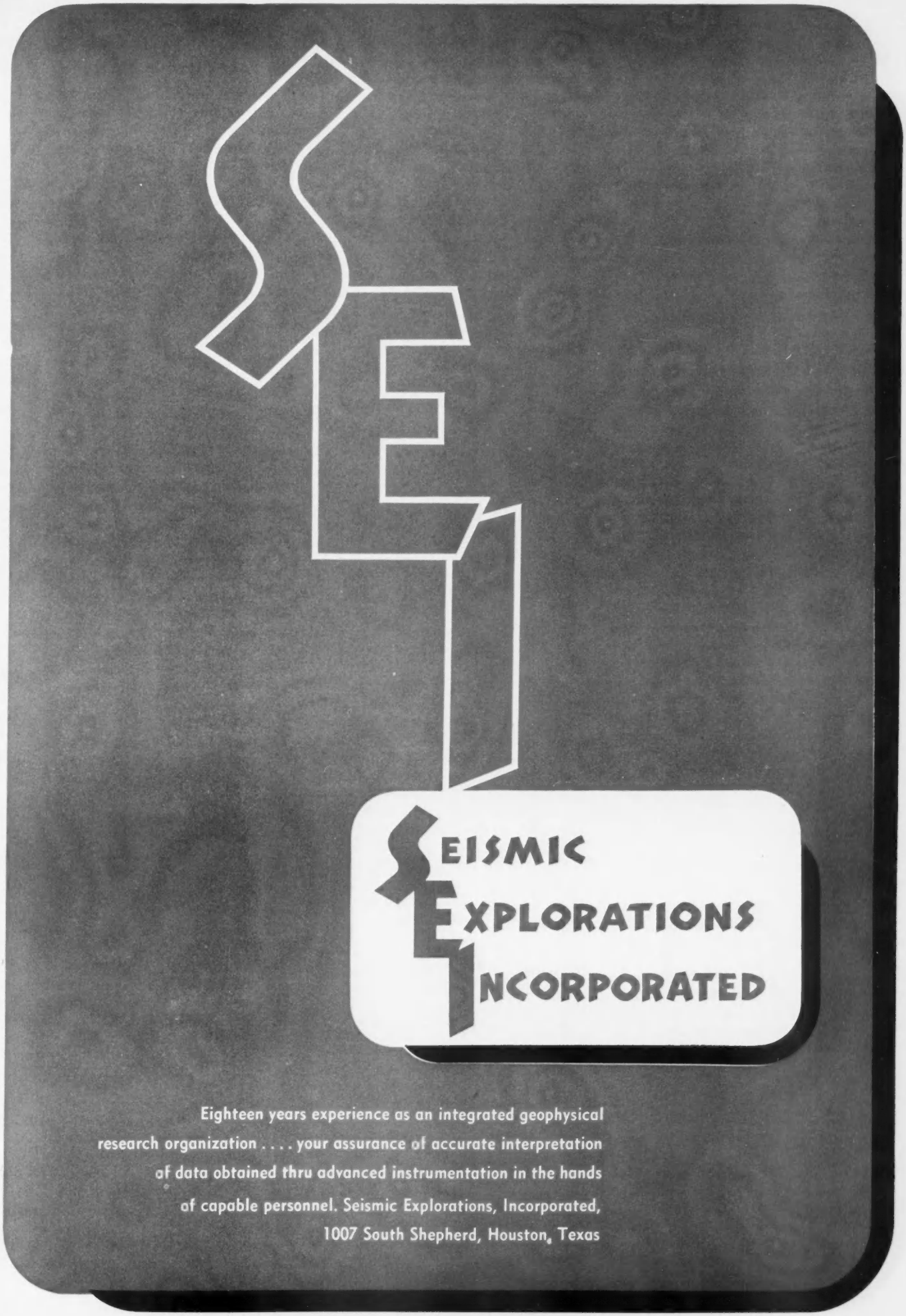
Most important of the other finds were two new zone discoveries in proven fields. They were the Allison zone in Guijarral Hills, Fresno County, and the Anderson 18-30 pool in the Russell Ranch field, Cuyama Valley, Santa Barbara County.

Colorado Activity Expected To Experience New Decline

Except in the Denver Basin of northeast Colorado, following discoveries at Gurley, Neb., and Borie, Wyo., there was little leasing activity in Colorado during the past year. The state continued to provide one wildcat disappointment after another and drilling is expected to decline during 1950.

The discovery at Borie, across the state line in Wyoming, indicated good Muddy Sand possibilities in northeast Colorado, but several exploratory tests failed in the late months of 1949.

Surface structures in Moffat and Routt counties in the northwest part of



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the state were leased up as a result of the Havenstrite Oil Company's discovery at Oak Creek in Routt County but the amount of drilling that will be done in that area this year is problematical.

Havenstrite's well was completed as a Morrison sand pumper for 300 barrels of 38-gravity oil a day. The well was shut in until market arrangements could be made and Havenstrite is drilling a second test.

The only other Colorado discovery during 1949 was the Amerada Petroleum Corporation gas well at Asbury Creek in Mesa County, which made 2 million cubic feet daily from the Dakota.

Discovery in Uintah County Stimulates Interest in Utah

Leasing slowed in Utah last year after wildcat failures in the Salt Basin and the southern part of the state, but a discovery at Roosevelt in Uintah County renewed interest in that region.

Stanolind Oil & Gas Company and The Carter Oil Company got a 600-barrel producer in the basal Wasatch at Roosevelt for the first production from that zone in the region. Development is being delayed until unitization of the field is completed, but other wildcat tests are being drilled in the area.

The strike increased interest in the western part of the Uintah Basin and The California Company started a test of its Gusher unit adjacent to Roosevelt on the southeast. Other operators with blocks in the region will drill during 1950.

Another prime area was the Basin and Range Province, extending from west of Salt Lake City into Nevada. Considerable leasing has been done there.

Wyoming Exploratory Work Due to Maintain Brisk Pace

Wyoming exploratory work will continue at a brisk pace in 1950 and development drilling will decline because of the restricted market for the state's crude.

Giving added incentive to exploration is the expanding market for petroleum products with the completion of pipe line outlets and steady expansion of refinery facilities.

Most spectacular test of the year was The Superior Oil Company's wildcat at Pacific Creek, Sublette County, which went to a record 20,521 feet. It was abandoned after a long series of formation tests. The Frontier sand was topped at 19,720 feet and Superior did not go to the Dakota.

Lease plays occurred late in the year in the southern part of the Powder River Basin following a Muddy sand discovery on the outskirts of the town of Glenrock, and in the Denver Basin as a result of discoveries at Gurley, Neb., and Borie, Wyo. Steelco Drilling Company made the Glenrock discovery with a well that flowed an average of 21 barrels of light green, 39.8-gravity oil an hour through one-fourth inch choke.

Steelco's lease is surrounded by holdings of Phillips Petroleum Company, which has started a drilling campaign extending into the town. A 7000-acre block south of the town was farmed out by Continental Oil Company to Far West Oil Company and the latter plans a drilling campaign.

The California Company made the discovery at Borie in Laramie County which contributed to the leasing campaign that extended from Nebraska, across part of Wyoming, and into Colorado. California drilled to granite at 11,374 feet before completing in the Muddy sand at 8570 feet. Initial output was 173 barrels of 38.4-gravity oil daily through one-fourth inch choke.

After putting together a spread extending from the Lightning Creek area of Niobrara County toward the southwest, The Atlantic Refining Company drilled a Sundance discovery at Lightning Creek, getting 300 barrels of 41.7-gravity oil a day.

In the Sussex area of Johnson County Continental made a Lakota sand discovery in the original test. Another opened a new pay in the Shannon sand. Then Delhi Oil Corporation discovered Sussex sand production.

Fast development drilling also is in prospect in the Lake Creek field of Hot Springs, following Barnsdall Oil Company's discovery of a new pay zone in the Tensleep. Previous production in the 25-year-old field was from the Embar.

Atlantic will drill more wells this year in the Riverton field of Fremont County to develop its Tensleep discovery there. The deep test went to 11,884 feet and flowed 485 barrels of 48.2-gravity oil daily. The Frontier sand also gave promise with gas and condensate showings, but these were not tested.

Increased Drilling Likely For Western Nebraska

The Ohio Oil Company made the first commercial oil discovery in western Nebraska late in 1949 and considerable drilling is in prospect during the year.

The strike, at Gurley in Cheyenne County, touched off an active leasing campaign throughout the Denver Basin.

Ohio's discovery well at Gurley pumped 225 barrels of 35-gravity oil daily from the First Dakota sand. Three other producers were completed in this zone and two in the Third Dakota.

At the start of 1950, Ohio completed a gas discovery in the Huntsman area, six miles southeast of Gurley. The well flowed 12½ million cubic feet daily from the Third Dakota.

Widespread Exploration Due To Take Place in Montana

Widespread drilling is in prospect in Montana this year, particularly in the central part of the state, where small but important discoveries were made during 1949.

In the last few weeks of 1949, Continental Oil Company was assembling acreage in the Blood Creek Syncline region of Petroleum, Garfield, Phillips and Fergus counties.

Extensive leasing was reported on the eastern side of the Powder River Basin and much land is being taken in the northeast part of Montana in Roosevelt, Daniels and Sheridan counties.

The Clark Fork area of Carbon County came into the limelight after a series of successes in the Northwest Elk Basin field and at Silver Tip in Park County, Wyo. Last fall, the British-American Oil Producing Company drilled a Dakota sand discovery well at Clark Fork that produced 2,244,000 cubic feet of gas and 31 barrels of 57.7-gravity distillate daily. The well was plugged back from 9446 feet in the Madison. The Phosphoria had strong shows but production tests were unsuccessful.

Market conditions will determine the extent of drilling in the Bowes field of Blaine County, where Northern Ordnance, Inc., made a 125-barrel-a-day discovery in the Ellis sand.

Brisk Leasing Follows New Interest in North Dakota

North Dakota moved back into the petroleum picture during 1949 when 10 million acres of land were leased.

This was followed by three wildcat failures. Continental Oil Company and The Pure Oil Company drilled one northeast of Bismarck in Burleigh County. The Union Oil Company completed another at Devil's Lake in Ramsey County. Karnes and associates drilled another in the Minot area of Ward County.

Continental and Pure have announced no new drilling plans for their 1½ million-acre spread in Burleigh, Sheridan and Emmons counties.

Idaho

In Idaho, Sun Oil Company has started an 8000-foot test to Pennsylvanian on a 110,000-acre spread in Bonneville County which was farmed out from the Sinclair Oil and Gas Company. Sun may drill five wildcats on the block in an exchange for a half interest in the land. The first test is on Big Elk Mountain.

Phillips Petroleum Company and Utah Southern Oil Company are preparing to start a 7000-foot test on the Juniper Anticline block in Oneida County.

38,331 New Wells in 1950 is

DRILLING FORECAST

By ELTON STERRETT
Engineering Editor

NEW wells to be drilled in the U. S. during 1950 in search of oil and gas will total 38,331, just 203 wells short of the mark set in 1949, and 998 under the all-time high of 1948. However, footage drilled during the year is estimated at a new high of 139,684,000 feet. This mark will exceed last years' total by 1.5 percent, and will be just over 5 million feet, or 3.73 percent, above the 1948 figure.

This increase in footage, and minor drop in number of wells over 1949's mark, is predicated on the continued trend toward deeper drilling, the pushing of wildcat wells to depths below existing horizons in many areas, and especially the concentration of a greater portion of the drilling in deeper regions. Discovery of deeper production in 1949, and the development of these fields during 1950, will call for a greater percentage of wells to be carried to those deeper established sands. Since the drilling rate for proven wells is usually considerably higher than for a wildcat being drilled through the same formations, the establishment of production will step up the number of wells which can be drilled per rig per year, and thus provide ample equipment capacity for the program as outlined.

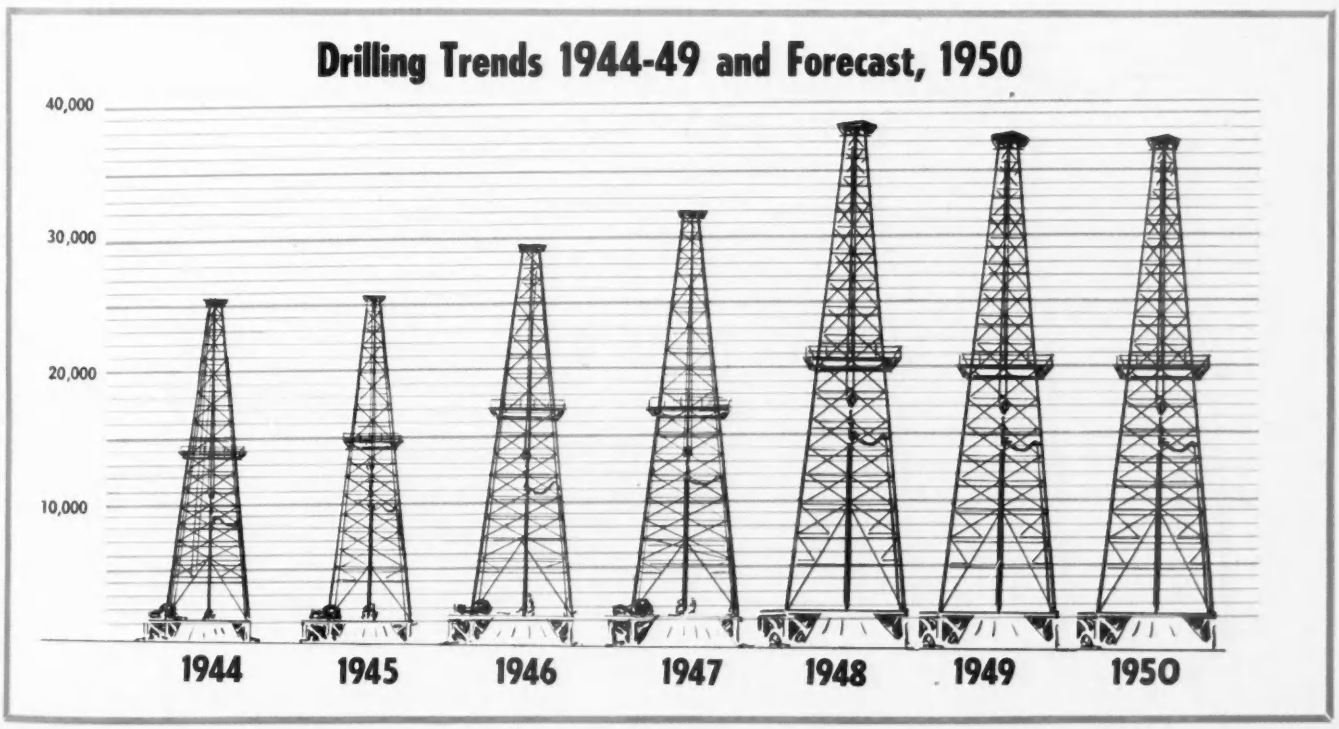
This forecast, as with previous ones throughout the past 17 years, is based on an annual survey by WORLD OIL, in which individual forecasts of anticipated drilling programs for 1950 are obtained from oil and gas companies who drilled eight or more wells during 1949. The company programs are weighed in conjunction with reports from regional engineers and geologists, and with individual forecasts made by representatives of the regulatory or advisory boards in states where petroleum is produced or where exploratory activity is scheduled. No estimate, either company, state official or individual, is quoted separately or printed as received; all being used solely in combination with others from the same area, and then only as factors in the combined data indicating the drilling aims of the area under consideration.

Controlling Factors in Forecast

First-of-the-year or annual budgeting of drilling programs by the companies assisting in compilation of basic data naturally reflects the attitude of the management of those companies at the time such data are forwarded, and involve the effect of such factors as price structure, tax manipulation, regulatory juggling, import and export, domestic demand, stocks, and labor and material conditions as of the date the budget or drilling program was established. A significant change in any of these variables will affect each company to the extent that such factor entered into its calculations, as will any outstanding field or area development, such as the Scurry County, Texas, activity in 1949.

The number of rigs in an area; the success or failure, from a comparative standpoint, of the wildcatting program for the previous year; available or pending pipe line facilities for the transportation of oil and or gas; size of companies operating in an area; all of these and many other factors combine to make up the data from which is drawn the figure setting forth the probable number of wells in detail for each area.

Figures given indicate the wells to be drilled in proven fields, as extensions,



for deeper pays, and exploratory wells of all types. Also included are salt-water disposal wells and those for the input of gas, air or water for repressuring or secondary recovery. Only in Kansas and Oklahoma, where no records of such wells are kept, are the latter classes of wells omitted from the forecast.

Figures on wells and footage for 1950, as well as those cited for 1949, do not include old wells drilled deeper nor footage made in so doing. Elimination of old wells drilled deeper from consideration in this forecast limits it to new wells only.

Trend by Areas

Of the 34 areas into which the U. S. oil industry is normally divided, 14 show an increase. Percentage-wise Utah leads all the others, with an indicated increase of 46.4 percent; Indiana barely made the plus side of the ledger with an 0.6 percent increase. West Texas, District 8, easily leads all others in gain of wells with an indicated 932 more wells than the 1949 figure, while another Texas district, No. 1 (South Central) comes nearest, on the plus side, to duplicating last year's record, an estimated seven more wells being scheduled there than during 1949.

On the decreased drilling side of the books fall 20 subdivisions. In this classification Florida, where projected drilling is off from 1949 by 38.9 percent, appears least promising, with Arkansas coming almost at the break-even point, with a percentage of —1.2. A drop of only four wells from the 1949 completions is indicated by Alabama and Arkansas, with the latter coming the nearest to last year's figure in the states drilling 100 or more wells. California, off 237 wells from last year's figures, and Illinois, down 222 wells, lead the list of states having the largest numerical reduction in wells to be drilled during 1950.

Texas leads all states in the total number of wells to be drilled, with 14,500 wells scheduled, for 37.82 percent of the nation's total. This compares with 36.05 percent drilled last year. Oklahoma shows for 4215 wells, or 10.99 percent of the wells to be drilled. Next in order come Kansas, with 2960; Illinois with 2495; Louisiana with 2363; California with 2170; Indiana with 1220 and Kentucky with 1020. All other states fall below the 1000-mark, although five Texas subdivisions, 8, 9, 7-B, 3 and 4, show for 3275, 2820, 2000, 1430 and 1290, and each schedules more than 1000 wells during the year.

Illinois Basin

In the Illinois Basin, comprising the states of Illinois, Indiana and the western half of Kentucky, where production is relatively close to the great consuming centers of the Midwest, Illinois, indicates a drop in drilling of 237 wells, for a percentage mark of —8.2. Indiana and western Kentucky, on the other hand, pick up 8 and 70 wells, respectively over last year's drilling, and thus reduce the cut anticipated in the Basin to a net of 159 wells. Such a margin, out of a total of 4735 wells forecast for the area, can easily be wiped out, should another surge of deeper development such as occurred in Indiana in 1947 come about through wildcat activity in some portion of the Basin where deeper production has been missed by current drilling.

In the Mid-continent area, both Kansas and Oklahoma indicate a reduction in

Indicated Number of Wells and Footage to Be Drilled in 1950

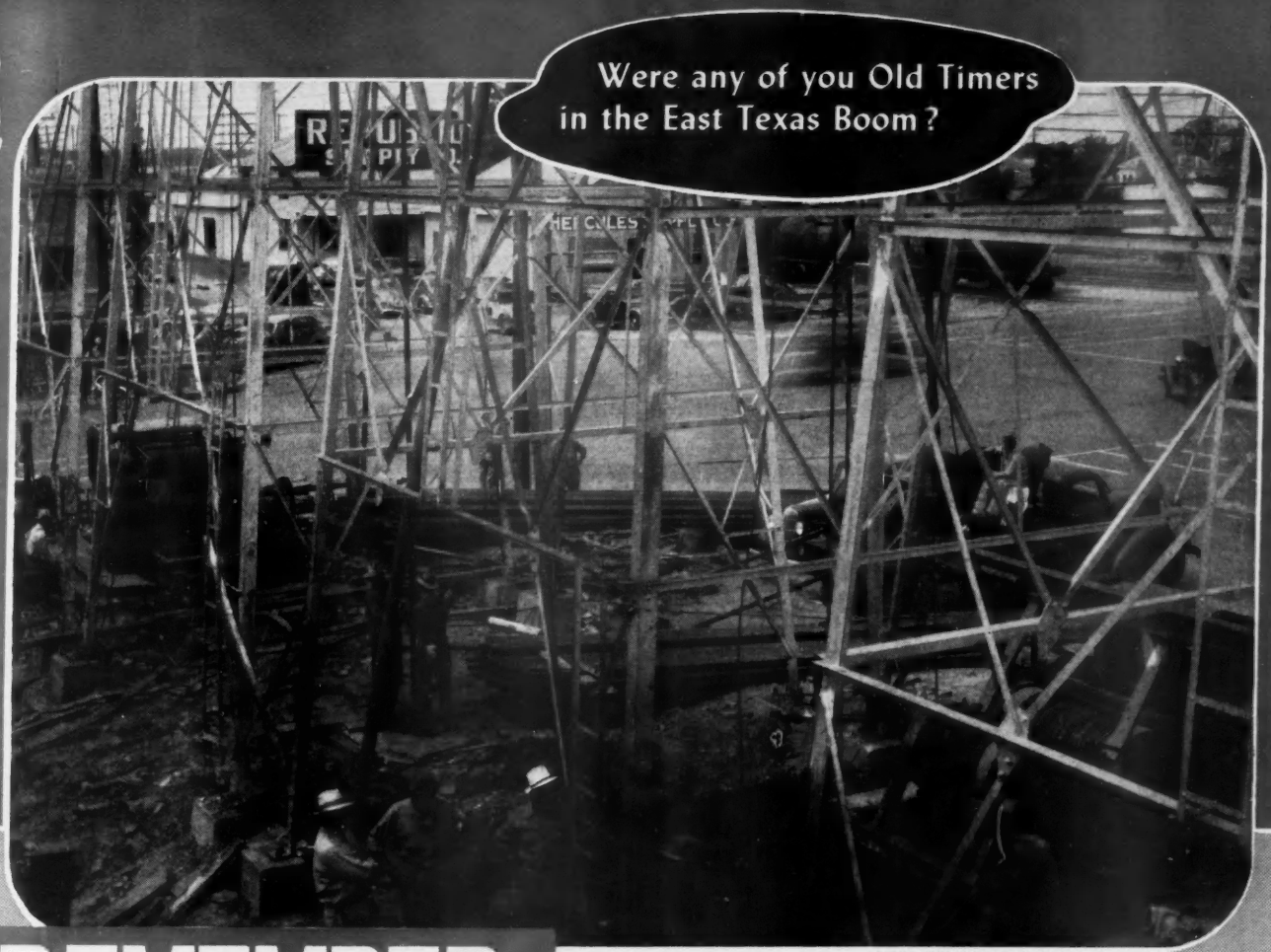
Forecast covers all new wells to be drilled for oil or gas in 1950, salt-water disposal wells, and water or gas-input[1] wells for repressuring and secondary recovery, but does not estimate old wells drilled deeper.

STATE or DISTRICT	NEW WELLS			EXPLORATORY TESTS		FOOTAGE[2]			
	Forecast, 1950	Drilled, 1949	Percent Change	Forecast, 1950	Percent New Wells	To be Drilled, 1950	Drilled, 1949	Percent Change From 1949	Percent of U.S. Total
Alabama	14	18	— 22.2	12	85.7	68,000	86,528	— 21.4	0.049
Arkansas	329	333	— 1.2	135	41.0	1,299,000	1,303,803	— 0.4	0.930
California	2,175	2,412	— 9.8	350	16.1	8,958,000	9,864,371	— 9.2	6.413
Colorado	75	68	+ 10.3	44	58.7	340,000	298,978	+ 13.7	0.243
Florida	11	18	— 38.9	8	72.7	77,000	125,743	— 38.8	0.055
Illinois	2,495	2,717	— 8.2	678	27.2	5,839,000	6,311,519	— 7.5	4.180
Indiana	1,220	1,212	+ 0.6	415	34.0	2,333,000	2,262,395	+ 3.1	1.670
Kansas	2,960	3,081	— 3.9	510	17.2	9,846,000	10,164,043	— 3.1	7.049
Kentucky	1,020	950	+ 7.4	85	8.3	1,905,000	1,757,517	+ 8.4	1.364
Louisiana	2,363	2,335	+ 1.2	300	12.7	13,300,000	12,492,074	+ 6.5	9.521
North Louisiana	1,338	1,428	— 6.3	160	12.0	4,373,000	4,643,808	— 5.8	3.131
South Louisiana	1,025	907	+ 13.0	140	13.7	8,927,000	7,484,266	+ 13.7	6.391
Michigan	945	901	+ 4.9	340	36.0	2,213,000	2,066,238	+ 7.1	1.584
Mississippi	304	337	— 9.8	117	38.5	2,220,000	2,454,063	— 9.5	1.589
Montana	220	250	— 12.0	65	29.5	559,000	624,542	— 10.5	0.400
New Mexico	585	499	+ 17.2	115	19.7	2,657,000	2,246,722	+ 18.3	1.902
New York	790	936	— 15.6	15	1.9	1,128,000	1,336,320	— 15.6	0.808
Ohio	935	1,028	— 9.0	38	4.1	2,009,000	2,196,101	— 8.5	1.438
Oklahoma	4,215	4,316	— 2.3	585	13.9	15,353,000	15,567,514	— 1.4	10.991
Pennsylvania	1,800	1,962	— 7.2	20	1.1	3,315,000	3,569,709	— 7.1	2.373
Texas	14,500	13,895	+ 4.4	3,358	23.1	61,137,000	58,137,798	+ 5.2	43.768
Dist. 1—South Central	561	554	+ 1.3	250	44.6	1,725,000	1,674,736	+ 3.0	1 235
Dist. 2—Middle Gulf	612	643	— 4.8	220	35.9	3,656,000	3,825,584	— 4.4	2.617
Dist. 3—Upper Gulf	1,430	1,387	+ 3.4	375	26.2	8,578,000	8,292,023	+ 3.4	6.141
Dist. 4—Lower Gulf-S.W.	1,290	1,313	— 1.8	425	32.9	6,572,000	6,640,149	— 1.0	4.705
Dist. 5—East Central	179	195	— 8.2	73	40.8	853,000	923,873	— 7.7	0.611
Dist. 6—Northeast	868	883	— 1.7	105	12.1	3,903,000	3,955,490	— 1.3	2.794
Dist. 7-B—North Central	2,000	1,887	+ 6.0	745	37.3	5,966,000	5,574,269	+ 7.0	4.271
Dist. 7-C—West Central	475	491	— 3.2	155	32.6	2,175,000	2,235,847	— 2.7	1.557
Dist. 8—West	3,275	2,793	+ 17.3	360	11.0	16,685,000	14,182,135	+ 17.6	11.945
Dist. 9—North	2,820	2,652	+ 6.3	640	22.7	7,818,000	7,300,133	+ 7.1	5.597
Dist. 10—Panhandle	990	1,097	— 9.8	10	1.0	3,206,000	3,533,559	— 9.3	2.295
Utah	72	56	+ 46.4	33	45.8	364,000	279,699	+ 30.1	0.261
West Virginia	575	499	+ 15.2	20	3.5	1,673,000	1,436,301	+ 16.5	1.198
Wyoming	570	598	— 4.7	148	26.0	2,734,000	2,828,940	— 3.3	1.957
Other States[3]	158	113	+ 40.2	124	78.5	425,000	214,794	+ 97.9	0.304
Total United States	38,331	38,534	— 0.5	7,515	19.6	139,684,000	137,625,712	+ 1.5	100.000

[1] Except in Kansas and Oklahoma, where such wells are not reported.

[2] Footage drilled in 1949 and footage forecast for 1950 include that for all new wells seeking production and for input or disposal purposes (except in Kansas and Oklahoma) but do not include footage of old wells drilled deeper in 1949 nor that footage expected to be added by drilling old wells deeper in 1950.

[3] Other states include: Arizona, Georgia, Idaho, Maryland, Missouri, Nebraska, Nevada, North Dakota, Oregon, South Dakota, Tennessee, Virginia and Washington. All percentages are computed to the nearest significant figure.

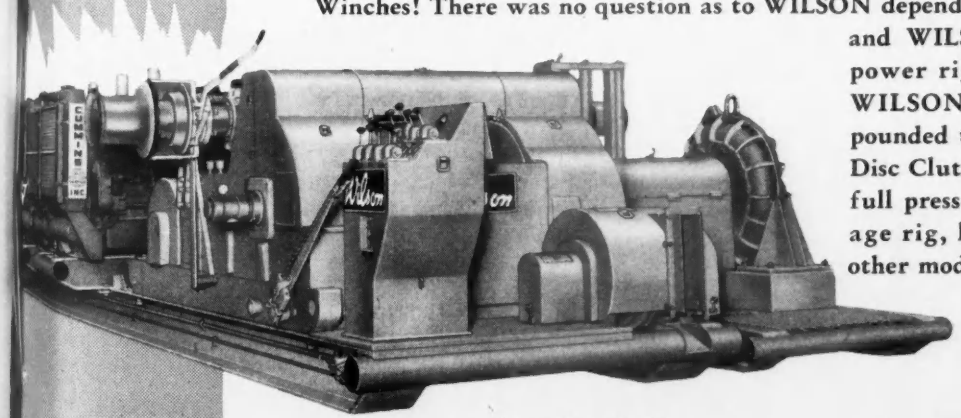


REMEMBER THE CITY WITH THE STEEL SKYLINE . . . KILGORE?

Fabulous Kilgore! Where you could walk across town and stay on the derrick floors . . . Where they tore down the bank building to drill oil wells on the site . . . Where oil once sold for 7½ cents a barrel, and chili was 10 cents a bowl!

. . . . Wilson WAS THERE! AND WILSON WAS FIRST!

The remarkable picture above was taken in 1935 in Kilgore. It shows three adjoining oil wells being brought in, and the work on all three of them is being done with WILSON Winches! There was no question as to WILSON dependability and advance design then . . . and WILSON IS STILL FIRST! The finest power rig ever built is exemplified in the WILSON GIANT TORCAIR RIG. Compounded torque converter drive, Air-Tube Disc Clutches throughout, Air Panel Control, full pressure water cooled brakes, one package rig, less than 12 feet wide, and many other modern features.



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activity over 1949 totals. Kansas will drill 2960 wells, 96.1 percent of last year's total, while Oklahoma will cut 101 wells from last year's 4316. The area's total of 7175 wells for 1950 is based on a continuation of present drilling rates, and on a continuation of the discovery rate set by last year's wildcatting in the area. Actual wells and total footage drilled by the oil industry in these two states will exceed the figures shown, because of the indeterminate factor involved in water-flood operations. Such wells, whether for water-input purposes or for the production of flood water, are definitely a part of the oil program, but cannot be checked accurately, as no regulation over their drilling is exercised, and no count kept of such drilling, by any of the state regulatory bodies.

Accelerated water-flood activities and greater returns of oil through such methods can affect adversely the drilling for new oil in the two Mid-Continent states. Lack of success in this undertaking, on the other hand, will be reflected quickly in a stepped-up drilling program so as to hold the oil produced within those states in line with demand.

Rocky Mountain Area

In the Rocky Mountain area the net gain of seven wells forecast for Colorado is offset by a loss of 30 wells in Montana and a drop of 28 scheduled for Wyoming. Completion of much of the wildcatting program for 1948 and 1949, with discouraging results in most of the areas tested, may be expected to confine 1950 drilling largely to proven areas, although Montana is expected to see a number of tests along the Canadian border, as will the area in North Dakota adjacent to the successful drilling across the border to the north. Other areas in the Rocky Mountain region, such as Utah on the one side and western Nebraska on the other, appear to be scheduled for drilling activity in 1950. In both states the result of the exploratory program was encouraging, and the confirmation of the discovery wells by offsetting producers may be expected to continue an accelerated drilling pace until the fields are fully defined. Western New Mexico likewise is expected to show increased activity during 1950.

Among the states with only a few wells, such as Alabama, Missouri, Virginia and Florida, the change percentage-wise is pronounced, but relatively few wells are scheduled, and extension of present producing areas is expected to be very slow. Results over the drilling program to date have not been such as to encourage activity over and above that required to fulfill lease obligations and to protect against possible offsetting.

Wildcatting

Following 1949's tremendous upsurge in wildcatting, 1950 promises to break the record set last year, forecast at 7515, which will be 19.60 percent of all wells to be drilled. This compares with 19.33 percent during 1949, and indicates that the industry is concentrating on the finding of new reserves, even in the face of cutbacks in production during 1949.

Wildcatting is scheduled for the various areas in amounts ranging from 100 percent in those states where exploratory programs are under way but in which no production as yet has been established, through Alabama, where 85.7 percent of all wells drilled will be wildcats, down to the Texas Panhandle, District 10, where a fraction more than 1 percent of the wells drilled will be exploratory. This percentage in the Panhandle is even below the nominal drilling of exploratory tests in such states as Pennsylvania and New York, each of which schedules more than ten wildcats listed for the 1950 program in the Panhandle.

Texas, with 3358 tests scheduled, will drill 44.68 percent of all the wildcats listed, as against 43.84 percent for 1949. The state's North Central area (7-B) lists the largest number of wildcats with 745, followed by 640 for North Texas (District 9) and 425 in the Lower Gulf-S.W. (District 4) area. These follow wildcat drilling totals of 699, 619 and 444, and only in the last-mentioned area is there any anticipated decrease in the number of exploratory tests over the previous year's mark. For the state as a whole, wildcatting is indicated to be up 2.78 percent over last year's mark, as against 4.4 percent for all drilling in the state. This indicates a slight reduction in the rate of exploratory drilling, and also reflects the vast amount of newly proven territory resulting from 1949's wildcat program, which will be developed during 1950. Among the states where more than 100 wildcats are expected to be drilled during the year, six of the 11 Texas districts, Arkansas, Indiana, Michigan and Mississippi anticipate that more than 32.6 percent of their total drilling will be of the exploratory type. Montana, with 29.5 percent; Illinois, with 27.2, and Wyoming, with 26 percent, will drill more than one wildcat out of every four wells during 1950. In most of these areas, there is a sharp increase in the percentage of wildcats to be drilled, even though there is a decrease noted in the total number of wells to be drilled within the same area. Only Mississippi, Illinois and Wyoming show a decrease in both number of wildcats and proven field wells for 1950.

Although the number of wells to be drilled in 1950 falls 0.5 percent behind 1949's total, the footage of 139,684,000 forecast for the year is anticipated to exceed last year's by 2,058,000 feet, or 1.5 percent above the former record figure. This will give an average depth of all wells of 3644 feet, as against 3570 feet for 1949 wells. This increase per well is largely due to the trend toward deeper drilling in all areas, but also because of the shift of drilling from the shallower areas of New York, Pennsylvania and Ohio to deeper production in Oklahoma, Louisiana, Texas and New Mexico.

Gain for Texas

Texas, scheduling 61,137,000 feet of hole for 1950, leads other states with 43.76 percent of the footage forecast. This compares with 58,137,798 feet, for 42.24 percent of the nation's total, in 1949. As in 1949, West Texas (District No. 8) leads all other Texas subdivisions, with an anticipated 16,685,000 feet of hole to be drilled in 1950. This is 26.47 percent of all the footage scheduled for the state, and almost 12 percent of the total footage of the U. S. to be drilled. If West Texas is able to make its drilling schedule, and Oklahoma does as well, that state will yield first place in the table on footage to the Texas district. In 1949 Oklahoma drilled 15,567,514 feet, while West Texas showed 14,182,135. Estimates for 1950 show West Texas to lead by 1,332,000 feet, whereas in 1949 Oklahoma was ahead by 1,385,379 feet. This swing is, of course, largely predicated on continuation of the indicated drilling rate in Scurry County, Texas, and adjoining areas.

It is significant that in no state which shows a decrease in percentage of wells for 1950 is there a change in sign for the percentage of footage to be drilled, though in many instances the drop is less in the footage column than in the number of wells to be drilled. This is brought about by a combination of deeper drilling and augmented wildcat programs, and is reflected in the grand totals for both wells and footage, where the percent change shifts from —0.5 to +1.5 and thus reflects the over-all trend toward deeper drilling.

Although wells indicated in the areas which are grouped under "Other States" do not show sufficient activity to justify separate listings, it is significant that the wells forecast in them for 1950 are up 78.5 percent from 1949, and the footage is almost doubled, showing a 97.9 percent increase. Discoveries in any of these essentially wildcat states can and probably will raise them in importance to where they can materially affect both wells drilled and footage made, and thus affect the nation's totals.

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1949

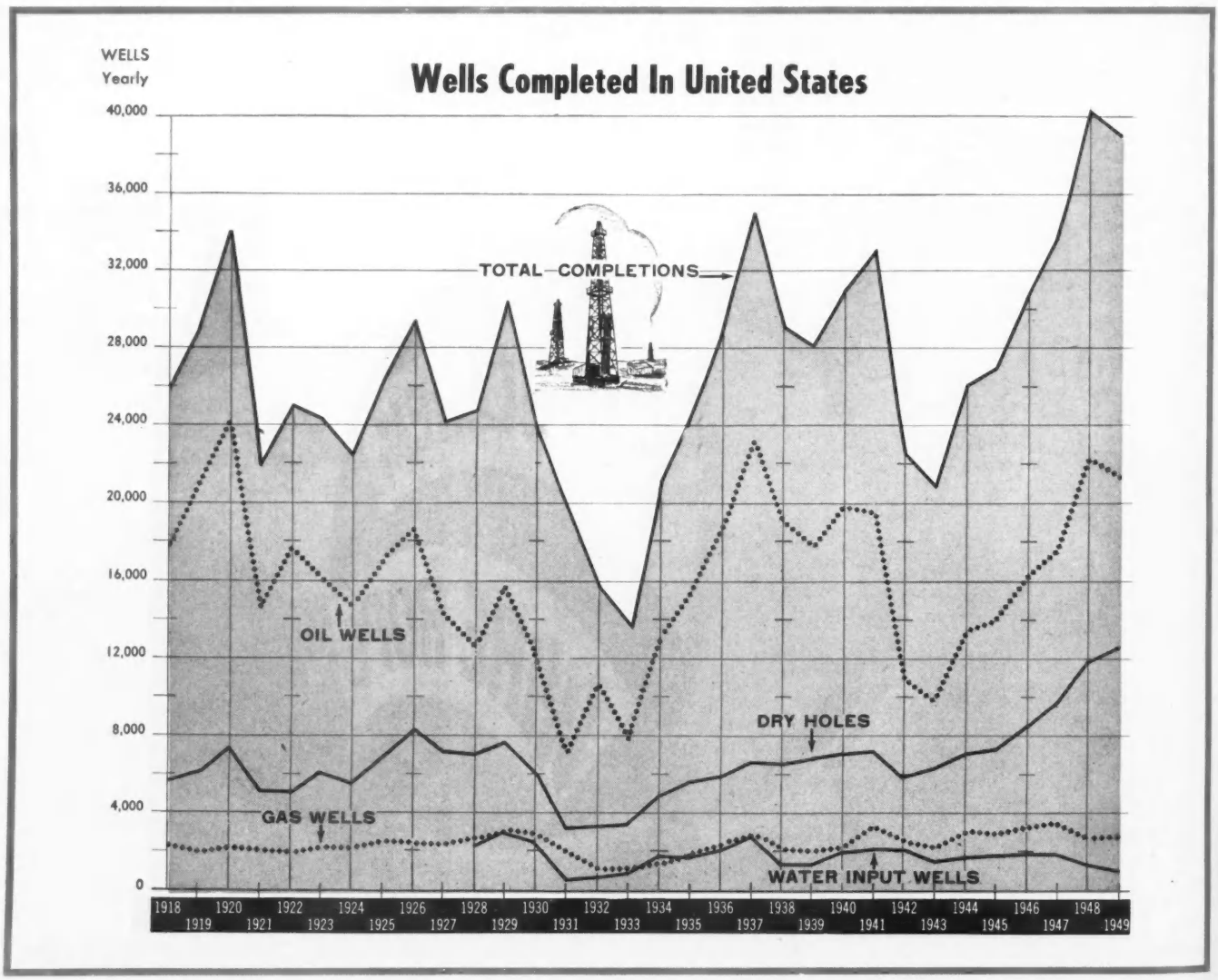
WELLS COMPLETIONS

Fewer Than in 1948, But Footage at New Peak

CONSIDERABLY fewer wells were completed in the U. S. during 1949 than the all-time peak established the previous year, but the amount of footage drilled rose to the highest level in history as more of the completions were located in deeper producing regions.

A total of 39,015 wells of all classes were completed in the nation last year, a decrease of 995 wells or 2.5 percent less than the 40,010 completed in 1948. Despite the decline, drilling activity was the second highest on record by a considerable margin. Although the number of wells declined, the amount of footage involved in completions during the year rose nearly 1 million feet to a new peak of 138,016,943 feet.

The primary cause for the reduction in completions was a sharp decrease in the Eastern states. The increase in footage in the face of a decline in number of wells completed undoubtedly was the result of the concentration of a much larger portion of the completions in deeper regions. Drilling activity in several areas which produce from greater than normal depths was above 1948 levels—notably Texas. While the gain in number of wells completed in states where formations are at greater depths was not sufficient to fully offset the appreciable loss in the Eastern states,



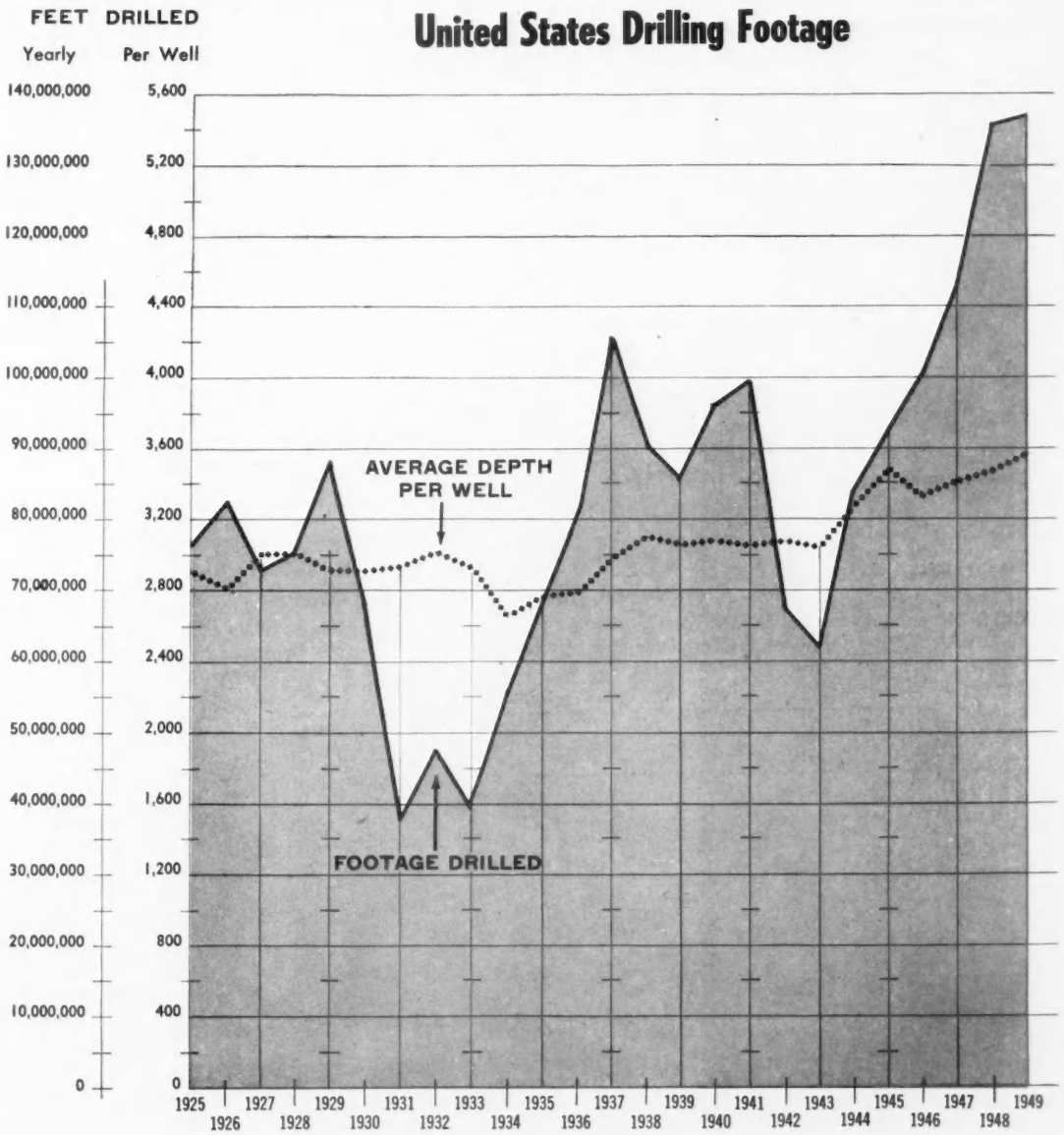
more footage was drilled because the average depth of completions was much larger.

A slight decrease in wells completed but a continued gain in amount of footage drilled is forecast for 1950 WORLD OIL's forecast for completions and footage in 1950 appears on pages 75 and 76.

The 39,015 wells completed in 1949 comprised 37,312 tests seeking oil or gas production, 1018 water input wells, 146 gas injection wells, 58 salt water disposal wells, and 481 old wells drilled deeper. This was in contrast with the completion during 1948 of 37,448 new wells drilled for oil or gas production, 1885 water input wells, 84 gas injection wells, 60 salt water disposal wells, and 533 old wells drilled deeper. Consequently, while total completions were down 2.5 percent, the number of wells seeking production declined only 0.4 percent; water input wells dropped 46 percent; gas injection wells rose 74 percent; salt water disposal wells remained practically unchanged; and old wells deepened fell off 10 percent.

Exclusive of old wells drilled deeper, the industry completed 38,534 wells in 1949 against the all-time high of 39,477

United States Drilling Footage



YEAR	New Wells Completed	Footage Drilled	Average Depth per Well	YEAR	New Wells Completed	Footage Drilled	Average Depth per Well	YEAR	New Wells Completed	Footage Drilled	Average Depth per Well
1925....	26,412	76,594,800	2900	1933....	13,523	39,568,298	2926	1941....	32,510	99,347,714	3056
1926....	29,456	82,476,800	2800	1934....	21,122	56,141,433	2658	1942....	21,990	67,903,053	3088
1927....	24,089	72,267,000	3000	1935....	24,851	67,844,939	2760	1943....	20,349	61,991,857	3046
1928....	24,765	74,295,000	3000	1936....	28,962	80,996,816	2797	1944....	25,786	84,378,457	3272
1929....	30,363	88,052,700	2900	1937....	35,213	105,099,189	2985	1945....	26,649	92,982,113	3489
1930....	23,711	68,761,900	2900	1938....	29,127	90,585,158	3110	1946....	30,230	101,124,813	3345
1931....	12,959	37,892,116	2924	1939....	28,012	85,523,094	3053	1947....	33,147	112,816,124	3404
1932....	15,836	47,682,196	3011	1940....	31,149	96,182,605	3088	1948....	39,477	136,709,153	3463
								1949....	38,534	137,625,712	3572

Data for Old Wells Drilled Deeper not included in above statistics. **Source:** Records of THE OIL WEEKLY and WORLD OIL.

in 1948. As to be expected, these wells accounted for most of the footage drilled, with a total of 137,625,712 feet in 1949 against 136,709,153 feet in the preceding 12 months. This constituted an average depth of 3572 feet for every well completed during the year, an all-time high, which, as previously pointed out, was due to greater activity in deeper areas and less work in shallow regions. The gain in average depth of wells was remarkably sharp; completions in the preceding year had averaged only 3463 feet and the previous greatest average depth per well was 3489 feet reached in 1945.

Of the 37,312 new tests drilled in search of production last year, 24,715 proved productive of oil, gas or distillate. Thus, 66 percent of these wells found production in contrast with 68 percent success in the preceding year. This meant that the number of dry holes completed hit a new high despite the completion of fewer total wells. There were 12,597 failures in 1949, which topped the 11,939 of 1948. Dry holes accounted for 34 percent of all wells seeking production, whereas 32 percent failed to produce in 1948.

A larger number of states participated in the drilling campaign last year. Tests were drilled in 35 of the 48 states, while only 31 states had experienced oil or gas drilling operations in 1948.

Despite the larger number of regions which took part in drilling operations, the leading producing states continued to account for the bulk of the wells completed. Seventy-two percent of all wells completed were in Texas, Oklahoma, Kansas, Illinois, California and Louisiana, which ranked in that order. In the preceding year these states accounted for 68 percent of the drilling. Although California completed 141 fewer wells, gains in the other five leading states boosted the six-state total to 29,151 completions in 1949 against 27,185 in 1948.

Texas experienced a sharp gain in drilling activity, completions in the state being up 1516 wells or 12 percent. A total of 14,112 wells were completed in the state during 1949, which was three times as many as any other state, and represented 36 percent of all wells drilled in the nation. Far more footage also was drilled in Texas than any other state. The footage involved in Texas completions totaled 58,316,093 feet, an increase of 9 percent and nearly 5 million feet. Texas' Panhandle, North, West Central, North Central and Upper Gulf Coast districts were responsible for the enlarged completion rate in the state.

Oklahoma retained second rank in the nation in both wells completed and amount of footage drilled. Wells completed in that state numbered 4411 in 1949, an increase of 6 percent over the 4151 drilled a year before. Oklahoma's footage totaled 15,624,655 feet, a gain of only 4 percent, as the average depth of its wells declined from 3610 to 3542 feet.

The combined footage of Texas and Oklahoma was in excess of half of the nation's total for the year, accounting for nearly 74 million feet of the 138 million feet drilled.

The largest decline in drilling occurred in the Eastern states. Pennsylvania completed 1975 wells in contrast with 3306 in 1948, a loss of 1331 wells or 40 percent. This dropped the state from the third most active drilling area to seventh. West Virginia completions declined from 850 in 1948 to 512 during 1949, a loss of 39 percent. New York activity was off 47 percent, as completions totaled but 936 wells against 1781 in the preceding year. Ohio slumped from 1324 completions in 1948 to 1048 in 1949. Altogether, these Eastern states completed 2790 fewer wells in 1949.

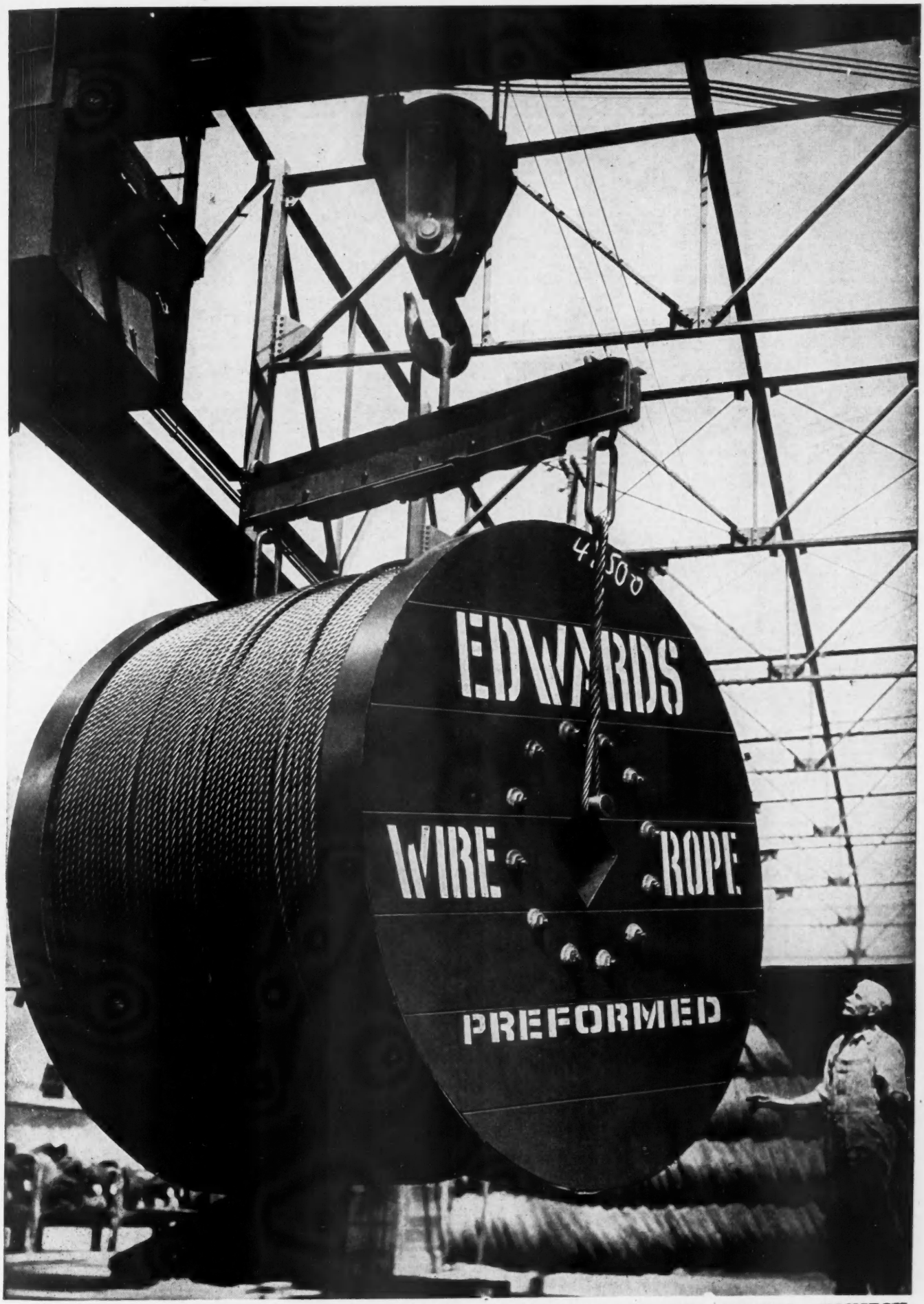
(See Table on Page 84)

Wells Completed Annually in United States

(Source: WORLD OIL and predecessor, The Oil Weekly, with aid of other authoritative sources, 1921 to now; 1920 and earlier years from U. S. Bureau of Mines and Petroleum in the United States and Possessions, by Arnold and Kemnitzer)

YEAR	NEW WELLS							Total New Wells	Old Wells Drilled Deeper	Total Completions
	Oil	Distillate	Gas	Dry	Water Input	Gas Injection	Salt Water Disposal			
1859–1917	380,502	....	20,183	91,821	.....	....	....	492,506	....	492,506
1918	17,860	....	2,324	5,629	.....	....	....	25,813	....	25,813
1919	21,041	....	2,153	6,075	.....	....	....	29,269	....	29,269
1920	24,278	....	2,275	7,476	.....	....	....	34,029	....	34,029
1921	14,715	....	2,081	5,193	.....	....	....	21,989	....	21,989
1922	17,790	....	1,926	5,191	.....	....	....	24,907	....	24,907
1923	16,182	....	2,140	6,043	.....	....	....	24,365	....	24,365
1924	14,707	....	2,172	5,591	.....	....	....	22,470	....	22,470
1925	17,029	....	2,536	6,847	.....	....	....	26,412	....	26,412
1926	18,626	....	2,502	8,328	.....	....	....	29,456	....	29,456
1927	14,382	....	2,494	7,213	.....	....	....	24,089	....	24,089
1928	12,505	....	2,754	7,164	2,342	....	....	24,765	....	24,765
1929	15,758	....	3,107	7,600	3,898	....	....	30,363	....	30,363
1930	12,133	....	2,971	6,163	2,444	....	....	23,711	....	23,711
1931	7,061	....	2,067	3,264	567	....	....	12,959	....	12,959
1932	10,569	....	1,079	3,389	799	....	....	15,836	....	15,836
1933	7,887	....	1,190	3,492	954	....	....	13,523	....	13,523
1934	13,119	....	1,496	4,811	1,696	....	....	21,122	....	21,122
1935	15,418	....	1,802	5,696	1,665	....	....	24,581	....	24,581
1936	18,704	....	2,375	5,787	2,096	....	....	28,962	....	28,962
1937	23,115	....	2,732	6,627	2,739	....	....	35,213	....	35,213
1938	19,106	....	2,143	6,515	1,363	....	....	29,127	....	29,127
1939	17,734	....	2,030	6,890	1,358	....	....	28,012	....	28,012
1940	19,843	....	2,265	7,053	1,988	....	....	31,149	....	31,149
1941	19,590	....	3,279	7,280	2,197	117	47	32,510	822	33,332
1942	10,977	105	2,685	5,962	2,141	73	47	21,990	588	22,578
1943	9,887	76	2,314	6,364	1,576	90	42	20,349	471	20,820
1944	13,502	54	3,024	7,153	1,784	218	51	25,786	377	26,163
1945	13,944	153	3,039	7,346	1,796	329	42	26,649	491	27,140
1946	16,087	207	3,355	8,496	1,816	219	50	30,230	615	30,845
1947	17,613	283	3,437	9,751	1,861	156	46	33,147	651	33,798
1948	22,197	346	2,966	11,939	1,885	84	60	39,477	533	40,010
*1949	21,352	379	2,984	12,597	1,018	146	58	38,534	481	39,015
Total	895,213	1,603	97,880	306,746	39,983	1,432	443	1,343,300	5,029	1,348,329

* Data for 1949 subject to slight revision.



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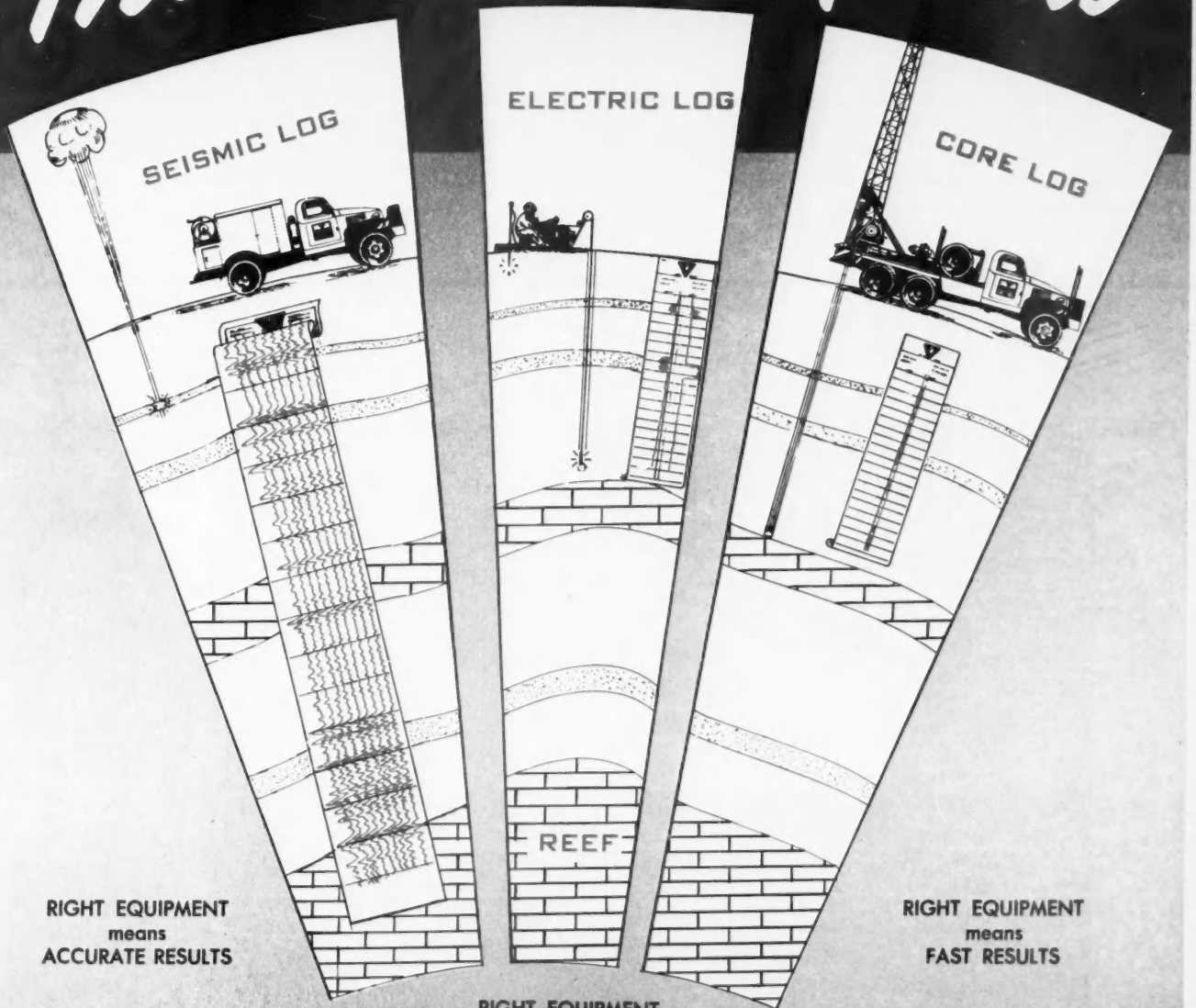
Footage and Average Depths Drilled in All Wells in the United States in 1949

STATE or DISTRICT	OIL			DISTILLATE			GAS			DRY			WATER INPUT			GAS INPUT		
	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth
Alabama	3	9,877	3,292							15	76,651	5,110						
Arizona										5	15,603	1,040						
Arkansas	171	638,058	3,731	2	18,122	9,061	8	26,892	3,362	151	618,539	4,096	1	2,192	2,192			
California	1,809	7,541,386	4,169				37	183,393	4,957	566	2,139,592	3,780						
Colorado	15	80,663	5,378				2	8,373	4,187	51	209,942	4,117						
Florida	2	23,164	11,582							16	102,579	6,411						
Georgia										4	12,437	3,109						
Illinois	1,383	3,310,872	2,393				7	7,746	1,107	1,326	2,990,736	2,255	1	2,165	2,165			
Indiana	497	916,553	1,844				29	29,662	1,023	684	1,313,906	1,921	1	892	892			
Kansas	1,503	5,008,617	3,335				414	1,141,364	2,757	1,132	3,906,575	3,451	1	85	85			
Kentucky	365	590 710	1,618				280	604,135	2,158	303	561,477	1,853	1	676	676	1	519	519
Louisiana	1,348	6,527,326	4,842	136	1,348,635	9,916	208	679,433	3,267	640	3,931,386	6,143	1	2,057	2,057			
North Louisiana	831	2,222,631	2,675	58	517,452	8,922	192	539,872	2,812	344	1,358,559	3,949	1	2,057	2,057			
South Louisiana	517	4,304,695	8,326	78	831,183	10,656	16	139,561	8,723	296	2,572,827	8,692						
Maryland							1	4,900	4,900									
Michigan	415	1,041,951	2,511				21	40,135	1,911	465	984,152	2,116						
Mississippi	143	1,015,829	7,104	15	123,238	8,216	2	17,970	8,985	177	1,297,026	7,328						
Missouri	4	1,744	436				9	3,315	368	19	12,019	633						
Montana	138	323,751	2,346	1	9,446	9,446	19	42,719	2,248	92	248,626	2,702						
Nebraska	4	17,613	4,403							10	41,633	4,163						
Nevada																		
New Mexico	330	1,594,995	4,833	1	3,500	3,500	54	197,648	3,660	114	450,579	3,952						
New York	560	775,760	1,385				3	11,305	3,768	9	37,619	4,180	364	511,636	1,406			
North Dakota										5	26,465	5,293						
Ohio	344	656,171	1,907				306	746,263	2,439	378	793,667	2,100						
Oklahoma	2,474	9,573,482	3,870	14	85,590	6,114	193	597,339	3,095	1,601	5,236,226	3,271	16	30,145	1,884	3	8,407	2,802
Pennsylvania	724	1,191,926	1,646				364	871,409	2,394	133	320,154	2,407	612	979,433	1,600	129	206,787	1,603
South Dakota										6	12,803	2,134						
Tennessee	8	8,487	1,061							35	36,004	1,029						
Texas	8,663	36,581,423	4,223	209	1,715,768	8,209	694	2,914,194	4,199	4,288	16,817,998	3,922	20	36,461	1,823	13	47,108	3,624
Dist. 1—South Central	236	805,954	3,415				5	24,683	4,937	312	841,127	2,696						
Dist. 2—Middle Gulf	295	1,804,615	6,117	46	366,970	7,978	73	361,261	4,949	229	1,292,738	5,645						
Dist. 3—Upper Gulf	763	4,240,877	5.558	82	744,173	9,075	45	287,093	6,380	496	3,004,726	6,058				1	15,154	15,154
Dist. 4—Lower Gulf-S.W.	645	3,292,160	5,104	50	397,697	7,954	94	531,368	5,653	524	2,418,924	4,616						
Dist. 5—East Central	83	427,889	5,155	9	70,403	7,823	5	29,021	5,804	96	383,135	3,991	1	4,625	4,625	1	8,800	8,800
Dist. 6—Northeast	687	2,821,630	4,107	20	131,093	6,555	45	290,583	6,457	128	698,013	5,453				1	3,429	3,429
Dist. 7-B—North Central	927	2,720,033	2,934	1	2,166	2,166	41	134,684	3,285	912	2,705,073	2,966				6	12,313	2,052
Dist. 7-C—West Central	335	1,496,562	4,467				4	14,940	3,735	152	724,345	4,765						
Dist. 8—West	2,461	12,545,321	5,098				20	93,996	4,700	310	1,540,269	4,969	2	2,549	1,275			
Dist. 9—North	1,544	4,242,489	2,748				9	41,230	4,581	1,073	2,968,583	2,767	17	29,287	1,723	4	7,412	1,853
Dist. 10—Panhandle	687	2,183,893	3,179	1	3,266	3,266	353	1,105,335	3,131	56	241,065	4,305						
Utah	29	127,843	4,408							27	151,856	5,624						
Virginia										1	7,401	7,401						
Washington										1	9,344	9,344						
West Virginia	89	204,162	2,294	1	2,323	2,323	324	967,333	2,986	85	262,483	3,088						
Wyoming	331	1,665,363	5,031				9	35,274	3,919	258	1,128,303	4,373						
Total United States	21,352	79,427,726	3,720	379	3,306,622	8,725	2,984	9,130,802	3,060	12,597	43,753,781	3,473	1,018	1,565,742	1,538	146	262,821	1,800

STATE or DISTRICT	SALT WATER DISPOSAL			TOTAL NEW WELLS—(Preceding Classes) 1949			TOTAL NEW WELLS—(Preceding Classes) 1948			OLD WELLS DRILLED DEEPER 1949 (Productive and Dry)			TOTAL ALL WELLS 1949			TOTAL ALL WELLS 1948		
	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth	Wells	Footage	Avge. Depth
Alabama				18	86,528	4,807	20	100,966	5,048	1	2,126	2,126	19	88,654	4,666	21	102,783	4,894
Arizona				5	15,603	3,121	4	9,651	2,413				5	15,603	3,121	4	9,651	2,413
Arkansas				333	1,303,803	3,915	321	1,310,087	4,081	3	132	44	336	1,303,935	3,881	322	1,310,182	4,069
California				2,412	9,864,371	4,090	2,588	9,238,678	3,570	73	54,814	751	2,485	9,919,185	3,992	2,626	9,274,017	3,532
Colorado				68	298,978	4,397	209	1,135,952	5,435	2	6,377	3,189	70	305,355	4,362	212	1,136,370	5,360
Florida				18	125,743	6,986	28	186,555	6,663				18	125,743	6,986	28	186,555	6,663
Georgia				4	12,437	3,109	3	13,781	4,594				4	12,437	3,109	3	13,781	4,594
Illinois				2,717	6,311,519	2,323	2,490	6,524,470	2,620	2	1,902	951	2,719	6,313,421	2,322	2,491	6,525,122	2,619
Indiana	1	1,382	1,382	1,212	2,262,395	1,867	1,095	2,070,876	1,891	8	3,753	469	1,220	2,266,148	1,857	1,101	2,071,469	1,881
Kansas	31	107,402	3,465	3,081	10,164,043	3,299	3,069	10,381,861	3,383	1	597	597	3,082	10,164,640	3,298	3,069	10,381,861	3,383
Kentucky				950	1,757,517	1,850	1,056	1,957,149	1,853				950	1,757,517	1,850	1,056	1,957,149	1,853
Louisiana	2	3,237	1,619	2,335	12,492,074	5,350	2,250	10,988,214	4,884	7	12,144	1,735	2,342	12,504,218	5,339	2,252	10,992,500	4,881
North Louisiana	2	3,237	1,619	1,428	4,643,808	3,252	1,476	4,041,407	2,738	6	10,971	1,829	1,434	4,654,779	3,246	1,478	4,045,693	2,737
South Louisiana				907	7,848,266	8,653	774	6,946,807	8,975	1	1,173	1,173	908	7,849,439	8,645	774	6,946,807	8,975
Maryland				1	4,900	4,900	1	5,259	5,259				1	4,900	4,900	1	5,259	5,259
Michigan				901	2,066,238	2,293	763	1,744,961	2,287	1	2,101	2,101	902	2,068,339	2,293	764	1,745,102	2,284
Mississippi				337	2,454,063	7,282	427	3,302,500	7,734				337	2,454,063	7,282	429	3,310,034	7,716
Missouri				32	17,078	534	52	19,324	372				32	17,078	534	53	19,520	368
Montana				250	624,542	2,498	301	740,890	2,461	1	1,978	1,978	251	626,520	2,496	305	744,715	2,442
Nebraska	1	5,025	5,026	15	64,272	4,285	9	27,672	3,075				15	64,272	4,285	9	27,672	3,075
Nevada							1	2,019	2,019							1	2,019	2,019
New Mexico				499	2,246,722	4,502	596	2,518,215	4,225	18	8,182	455	517	2,254,904	4,362	623	2,553,445	4,099
New York				936	1,336,320	1,428	1,781	2,489,741	1,398				936	1,336,320	1,428	1,781	2,489,741	1,398
New Jersey							1	2,380	2,380							1	2,380	2,380
North Dakota				5	26,465	5,293	2	6,105	3,053				5	26,465	5,293	2	6,105	3,053
Ohio				1,028	2,196,101	2,136	1,294	3,216,178	2,485	20	11,097	555	1,048	2,207,198	2,107	1,324	3,234,213	2,443
Oklahoma	15	36,325	2,422	4,316	15,567,514	3,607	4,053	14,931,016	3,684	95	57,141	601	4,411	15,624,655	3,542	4,151	14,986,638	3,610
Pennsylvania				1,962	3,569,709	1,819	3,262	5,917,477	1,814	13	15,031	1,156	1,975	3,584,740	1,816	3,306	5,967,215	1,805
South Dakota				6	12,803	2,134	3	7,260	2,420				6	12,803	2,134	3	7,260	2,420
Tennessee				43	44,491	1,035	67	75,708	1,130				43	44,491	1,035	67	75,708	1,130
Texas	8	24,846	3,106	13,895	58,137,798	4,184	12,369	53,260,128	4,306	217	178,295	822	14,112	58,316,093	4,132	12,596	53,406,259	4,240
Dist. 1—South Central	1	2,972	2,972	554	1,674,736	3,023	496	1,475,551	2,975	12	3,546	296	566	1,678,282	2,965	502	1,479,683	2,948
Dist. 2—Middle Gulf				643	3,825,584	5,950	721	4,369,248	6,060	14	14,327	1,023	657	3,839,911	5,845	738	4,387,967	5,946
Dist. 3—Upper Gulf				1,387	8,292,023	5,978	1,110	7,210,398	6,495	10	18,339	1,834	1,397	8,310,362	5,949	1,118	7,217,521	6,456
Dist. 4—Lower Gulf-S.W.				1,313	6,640,149	5,057	1,416	6,792,993	4,797	32	30,359	949	1,345	6,670,508	4,959	1,461	6,851,611	4,690
Dist. 5—East Central				195	923,873	4,738	240	1,120,625	4,669	1	45	45	196	923,918	4,714	244	1,124,255	4,608
Dist. 6—Northeast	2	10,742	5,371	883	3,955,490	4,480	725	3,397,966	4,687	7	4,177	597	890	3,959,667	4,449	731	3,401,163	4,653
Dist. 7-B—North Central				1,887	5,574,269	2,954	1,450	4,827,907	3,330	15	12,819	855	1,902	5,587,088	2,937	1,470	4,839,933	3,292
Dist. 7-C—West Central				491	2,235,847	4,554	417	1,848,841	4,434	20	12,247	612	511	2,248,094	4,399	424	1,854,009	4,373
Dist. 8—West				2,793	14,182,135	5,078	2,900	13,915,457	4,798	90	69,915	777	2,883	14,252,050	4,943	2,991	13,936,435	4,659
Dist. 9—North	5	11,132	2,226	2,652	7,300,133	2,753	2,270	6,277,726	2,766	16	12,521	783	2,668	7,312,654	2,741	2,293	6,290,266	2,743
Dist. 10—Panhandle				1,097	3,533,559	3,221	624	2,023,416	3,243				1,097	3,533,559	3,221	624	2,023,416	3,243
Utah				56	279,699	4,995	20	80,183	4,009	1	4,200	4,200	57	283,899	4,981	20	80,183	4,009
Virginia				1	7,401	7,401	2	3,744	1,872				1	7,401	7,401	2	3,744	1,872
Washington				1	9,344	9,344	11	46,578	4,234				1	9,344	9,344	11	46,578	4,234
West Virginia				499	1,436,301	2,878	833	2,278,419	2,735	13	13,757	1,058	512	1,450,058	2,832	850	2,286,148	2,690
Wyoming				598	2,828,940	4,731	496	2,115,156	4,264	5	17,604	3,521	603	2,846,544	4,721	526	2,141,647	4,072
Total United States	58	178,218	3,073	38,534	137,625,712	3,572	39,477	136,709,153	3,463	481	391,231	813	39,015	138,016,943	3,538	40,010	137,103,025	3,426

The Right Equipment



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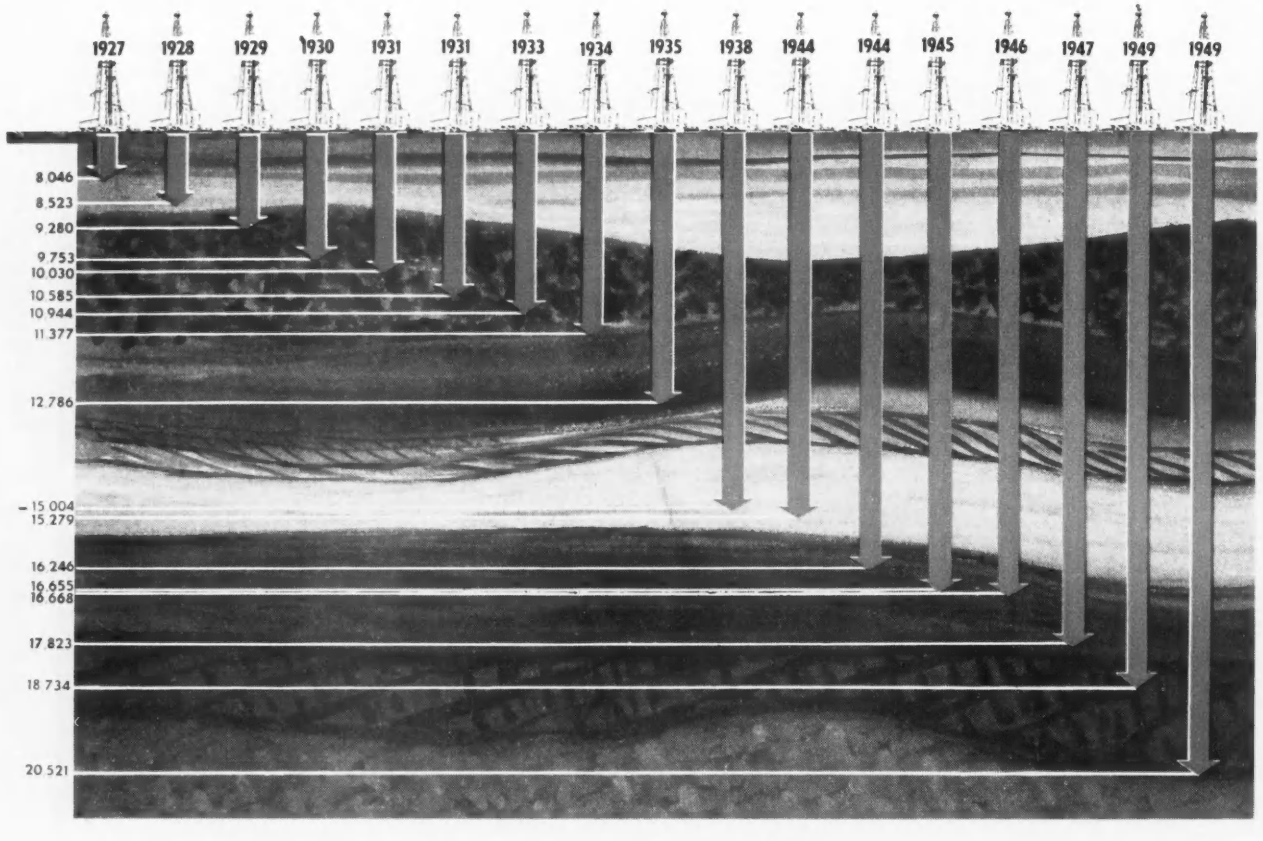
New DRILLING DEPTH RECORDS Established in 1949

THE world's drilling depth record was twice shattered by substantial margins in the U. S. during 1949. The two record-breaking tests represented significant milestones in deep drilling history, one being the first 18,000-foot completion and the other the first 20,000-foot penetration.

As operators of the U. S. continued to search deeper for new petroleum reserves, drilling depth marks were established for ten states during the past year.

The honor of drilling deeper than any other well goes to The Superior Oil Company of California's Unit 1, Sublette County, Wyoming, which reached the depth of 20,521 feet. Earlier in the year, the same company's Limoneria 1, in the



(Includes both dry and producing wells)

Year	Well and Location	Feet
1927	Chansler-Canfield-Midway Oil Company's Olinda 96, Olinda, California	8,046
1928	Texon Oil and Land Company's University 1-B, Big Lake, West Texas	8,523
1929	Shell Oil Company's Nesa 1, Long Beach, California	9,280
1930	Standard Oil Company of California's Mascot 1, Midway, California	9,753
1931	Chansler-Canfield-Midway Oil Company's Hobson A-2, Rincon field, Ventura County, California	10,030
1931	Penn-Mex Fuel Company's Jardin 35, State of Vera Cruz, Mexico	10,585
1933	North Kettleman Oil & Gas Company's (later taken over by Union Oil Company) Lillis-Welch 1, Kettleman Hills, Kern County, California	10,944
1934	General Petroleum Corporation's Berry 1, Belridge, Kern County, California	11,377
1935	Gulf Oil Corporation's McElroy 103, Gulf-McElroy, Upton County, West Texas	12,786
1938	Continental Oil Company's KCL A-2, Wasco, Kern County, California	15,004
1944	Phillips Petroleum Company's Ada Price 1, Wildcat, Pecos County, West Texas	15,279
1944	Standard Oil Company of California's KCL 20-13, South Coles Levee, Kern County, California	16,246
1945	Phillips Petroleum Company's Schoeps 3, Wildcat, Brazos County, Gulf Coast, Texas	16,655
1946	Pacific Western Oil Corporation's National Royalties 1, Miramonte area, Kern County, California	16,668
1947	Superior Oil Company of California's Weller 51-11, Wildcat, Caddo County, Oklahoma	17,823
1949	Superior Oil Company of California's Limoneria 1, Wildcat, Ventura County, California	18,734
1949	Superior Oil Company of California's Unit 1, Wildcat, Sublette County, Wyoming	20,521

North Montalvo area of Ventura County, California, established a depth record in drilling to 18,734 feet.

The third deepest well in the world, and record holder at the end of both 1948 and 1947, was another Superior operation which had drilled to 17,823 feet in Caddo County, Oklahoma. The new depth record of 20,521 feet exceeded this end of 1948 mark by 2698 feet and surpassed the other record-breaking test by 1787 feet.

Superior tests are the only ones in the world to reach and surpass 17,000 feet. All three of the wells were dry.

Another significant deep drilling development of the year was the establishment of a new record for cable tool penetration. A Pennsylvania test, Manufacturers Light & Heat Company's Barton Estate 8, in Fayette County, reached 10,312 feet during the year. This broke the previous record of 10,096 feet for cable tool drilling, which had been made by another Pennsylvania operation by the same company.

The great progress in drilling technique and equipment during recent years is ably illustrated by the remarkable advancement in deep drilling records. Although the 10,000-foot level was not reached until 1931, or 72 years after the industry's birth, the record for deepest penetration has doubled that figure in the last 19 years. The advance has been especially rapid since the end of the war, at which time the record for deep drilling stood at 16,246 feet.

Nineteen states, the same number as a year ago, now have had tests drilled to 10,000 feet or more. Behind Wyoming, California and Oklahoma, comes Texas and Louisiana with records in the 16,000-foot class. Mississippi, Alabama and Florida have experienced penetrations to 15,000 feet. New Mexico is alone in the 14,000-foot group, as is Utah in the 13,000-foot and Colorado in the 12,000-foot classifications. Montana, Arkansas, Michigan and Washington all have records in excess of 11,000 feet. Pennsylvania, North Dakota, North Carolina and West Virginia with 10,000-foot tests to their credit, complete the list of states which have had tests drilled to 10,000 feet or more.

Some states, notably, Louisiana, Texas, California and Oklahoma, of course, have been the site of numerous deep drilling operations. Drilling to 12,000 or even 13,000 feet in the states is a common occurrence.

Besides Wyoming and California, with their previously discussed new super-deep drilling marks, the following states had previously established depth records broken during 1949: Alabama with a 15,668-foot test; New Mexico, 14,716 feet; Utah, 13,766 feet; Montana, 11,519 feet; Pennsylvania, 10,312 feet; Virginia, 9229 feet; Arizona, 6863 feet; and Kentucky, 6686 feet.

Drilling Depth Records in U. S. by States and Districts

State or District	Feet	Year	Formation	Well, Location and Remarks
Wyoming	20,521	1949	U. Cretaceous	Superior Oil Company of California's Unit 1, Pacific Creek area, Sublette County, World's Deepest.
California	18,734	1949	U. Miocene	Superior Oil Company of California's Limoneria 1, North Montalvo area, Ventura County.
Oklahoma	17,823	1947	Pennsylvanian	Superior Oil Company of California's Weller 51-11, Sect. 11-8n-12w, Caddo County.
Upper Texas Coast	16,655	1945	L. Cretaceous	Phillips Petroleum Company's Schoeps 3, Millican salt dome area, Brazos County.
East Texas	16,347	1949	Smackover	Humble Oil & Refining Company's R. P. McWatters 1, Freestone County.
South Louisiana	16,106	1948	Miocene	The Texas Company's State-Barataria Bay 4, Lse. 356, Queen Bess Island area, Jefferson Parish.
Lower Texas Coast	16,006	1947	Frio	The Texas Company's Yturria L. & L. Co. 6, Raymondville area, Willacy County.
Mississippi	15,730	1947	.....	Superior Oil Company of California's Cassie Bradford 1, Sect. 1-3n-13w, Forrest County.
Alabama	15,668	1949	.....	Humble Oil & Refining Company's Williams 2, Sect. 21-6n-4w, Washington County.
Florida	15,455	1947	L. Cretaceous	Gulf Refining Company's State of Florida 1, Big Pine Key area, Monroe County.
South Central Texas	15,301	1945	L. Cretaceous	Quintana Petroleum Company's South Texas Syndicate 3-D, McMullen County.
West Texas	15,279	1944	Ellenburger	Phillips Petroleum Company's Ada Price 1, T. C. Railway Survey, Pecos County.
New Mexico—S.E.	14,716	1949	Salt	Humble Oil & Refining Company's Federal-Wiggs 1, Sect. 31-24s-27e, Eddy County, Still Drilling.
Texas Panhandle	14,278	1949	.....	Gulf Oil Corporation's E. Porter 1-A, Lipscomb County.
Southwest Texas	14,033	1948	Frio	The Texas Company's C. C. W. C&I D. 5-1, Potrero del Espiritu Santo Gr. Cameron County.
Utah	13,766	1949	Pennsylvanian	Pacific Western Oil Corp. & Equity Oil Company's Unit 1, Sect. 33-21s-21e, Grand County.
North Texas	13,352	1947	Simpson	Denver Producing & Refining Company's Rich 1, Grayson County.
North Louisiana	12,952	1942	Smackover	Union Producing Company's McDonald Unit 1, North Lisbon field, Claiborne Parish.
Colorado	12,702	1946	Pennsylvanian	The Texas Company-The California Company's Unit 20, Wilson Creek field, Rio Blanco County.
East Texas Border	12,221	1946	Smackover	Humble Oil & Refining Company's Pickering Lumber Co. 1, Huxley field, Shelby County.
Montana	11,519	1949	Cambrian	Shell Oil Company's Crow Tribal 7904-1, Sect. 36-9s-37e, Big Horn County.
Arkansas	11,440	1948	Smackover	Stanolind Oil & Gas Company's Union Saw Mill 1, Sect. 18-19s-24w, Lafayette County.
Michigan	11,012	1948	Cambro-Ord.	Ohio Oil Company-Pure Oil Company's Reinhardt 1, West Branch field, Ogemaw County.
Washington	11,002	1947	.....	Standard Oil Company of California's Alderwood Comm. 1, Snohomish County.
Pennsylvania	10,312	1949	U. Cambrian	Manufacturers Light & Heat Co.'s Barton Estate 8, Fayette County, World's deepest cable tool well.
North Dakota	10,281	1938	Devonian	The California Company's Kamp 1, Nesson Anticline, Williams County.
North Carolina	10,054	1946	Granite	Standard Oil Company of New Jersey's Cape Hatteras 1, Dare County.
West Virginia	10,018	1941	Queenston	Hope Natural Gas Company's C. S. Gribble 2-8517, Grant District, Harrison County.
New Mexico—N.W.	9,466	1945	Quartzite	Southern Union Gas Company's Ute 9, Barker Creek field, San Juan County.
Oregon	9,263	1946	.....	The Texas Company's Cooper Mountain 1, Washington County.
Virginia	9,229	1949	.....	The California Company's Kipps Anthracite Coal Co. 1, Montgomery County. Still drilling.
New York	8,626	1944	Ordovician	New Penn Development Company's Harrington 1, Woodhull Township, Steuben County.
Kansas	8,243	1947	Arbuckle	Stanolind Oil & Gas Company's Feathers 1, Sect. 15-35s-33w, Seward County.
Maryland	8,165	1941	Helderburg	William Snee's Schartzer 1, Accident District, Garrett County.
South Dakota	8,000	1943	Ordovician	Northern Ordance Co., Inc. et al's Harding Co. School Land 1, Camp Crook Anticline, Harding County.
North Central Texas	7,980	1945	Ellenburger	Humble Oil & Refining Company's C. H. Tompkins 1, T&P Railway Survey 169, Parker County.
Ohio	7,889	1933	Clinton	Benedum and Trees' Knowlton 1, Independence Township, Washington County.
Georgia	7,490	1944	Cretaceous	Stanolind Oil & Gas Company's J. H. Pullen 1, Mitchell County.
Illinois	7,207	1940	St. Peter	Pure Oil Company's Billington 3, Sect. 26-1n-7e, Cisne field, Wayne County.
Arizona	6,863	1949	.....	A. S. Waddell et al's Unit 1, Sect. 23-13s-24e, Cochise County.
Nebraska	6,846	1938	Pennsylvanian	Union Oil Company of California's Agate 15-1, Sioux County.
Western Kentucky	6,686	1949	Knox	Pure-Ashland-I. B. Browning's M. L. Walker 1, Sect. 22-N-24, Webster County.
Indiana	6,408	1946	Trenton	Continental Oil Company's Cooper 1-D, Griffin field, Gibson County.
Tennessee	5,750	1947	Granite	The California Company's E. W. Beeler 1, Sect. 4-15s-29e, Giles County.
Eastern Kentucky	5,743	...	Red Medina	Columbian Fuel Corporation's Ford Motor Company 1, Pike County.
Iowa	5,305	1930	Cambrian	Oil Development Company's Wilson 1, Page County.
Missouri	4,740	1941	Cambrian	Strake Petroleum Company's T. P. Russell 1, Pemiscot County.

Swift Progress Made in

and Equipment

By EARLE C. HELLUMS

Vice President, Cron & Gracey Drilling Corporation

SINCE THE END OF WORLD WAR II, developments in drilling equipment and methods have moved swiftly. For the past two years, the Houston Chapter, API, has devoted its January meeting to the discussion of new equipment and methods in drilling and production. In order that these new developments be brought to the attention of WORLD OIL readers, proceedings of the January 31 meeting were transcribed by wire recorder, and with the permission of the API chapter and the authors, the discussions of new things in the industry are presented. Several outstanding pieces of drilling equipment and drilling methods devised and proved during 1949 were briefly described.

Construction features of the three-cone, jet-type rock bit are shown in this side view of the bit. Mud is being pumped through the nozzles built into the bit between cones.

EXCEPT from the standpoint of field application or test, not all of the equipment and methods described are new. Experimentation with the jet-type rock bit has been continued and a number of wells have been drilled. This type bit employs a high-velocity jet mud stream which results in rapid removal of cuttings and scouring of the bottom of the hole, thereby permitting an increase in drilling rate.

Three- and two-cone bits are now being used, both of which have long cutting teeth and tungsten-carbide nozzles. The three-cone bit has three fluid nozzles and the two-cone bit has two nozzles. Each bit has the jets positioned to discharge fluid between the cutters onto the bottom and approximately 1½ inches from the outside of the hole. The nozzles are so directed that approximately 75 percent of the bottom of the hole is flushed.

Field tests made with jet rock bits to date in broken sand and shale and in medium-hard formations indicate they will drill as much or more hole than the conventional rock bit, and they will drill the hole from 20 to 33 percent faster. Some trouble has been encountered with premature washing out of the outer nozzle tubes on the two-cone bit. However, it is thought that present contemplated minor changes in bit design will eliminate this problem. Results to date seem promising, but all the answers are not yet at hand. A great many more wells will have to be drilled in different areas and in different formations before the bit can be fully evaluated.

Jet Coring Bits

The jet idea has been applied to coring bits, the objectives being to increase drilling rates between coring points while drilling with the bit plug in place. In addition to the tungsten-carbide nozzles, guide ribs have been added to the body of the coring bit to stabilize it. These guide ribs seem to have been advantageous as a greater percentage of full sized cores were recovered.

A packoff arrangement has been provided on the core barrel head to seal the space between the barrel and the bit body.

Charged Pump Suctions

Another development, which seems to be a slightly controversial subject, has been in use for some time, and due to the fact that there are a number of installations in operation, this practice will be described. This relatively new development is the charging of power mud pump suctions by use of a centrifugal pump. Illustrated is a 16-inch power pump which has a 5- by 6-inch centrifugal pump charging the suction, the pump being V-belt driven from the main pump sheave.

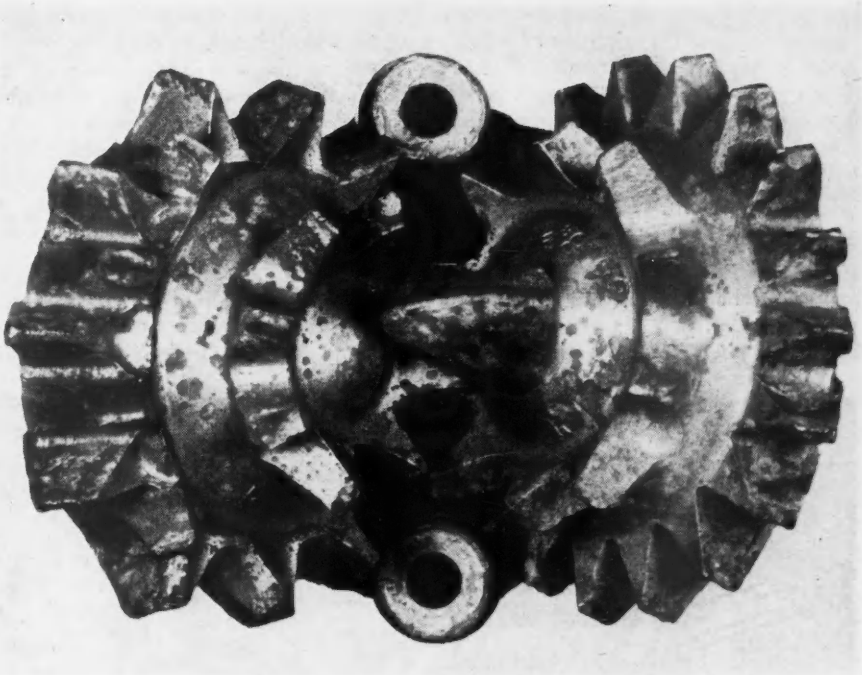
The pump drive is designed to hold 15 pounds per square inch pressure on the pump suction at the slowest speed

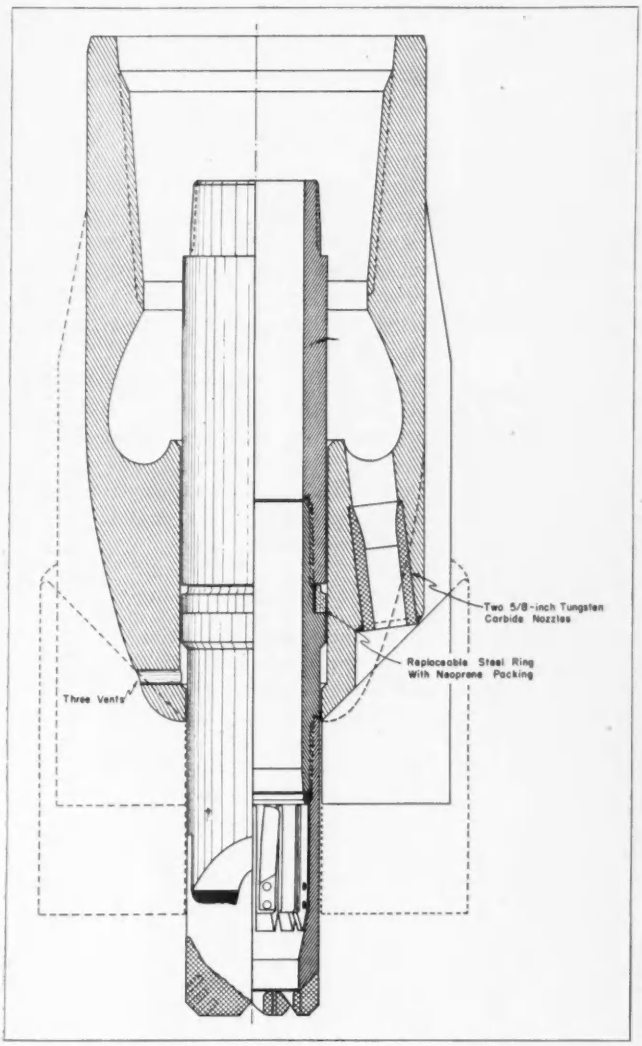
desired on the power pump. Present information indicates that charging pump suctions may increase the life of valves and seats, and possibly pistons and liners. Complete filling of the pump suction should result in smoother operation at rated maximum pump speed, and may allow increased speeds. Most of the pump manufacturers are now giving some thought to this subject.

Coil Type Water-Tube Boiler

An important piece of equipment which is now being field tested is the Bettis boiler. This is a 300 horsepower coil-type, water tube boiler which is recommended to produce a maximum of 20,000 pounds of steam per hour at maximum pressure of 500 pounds per square inch, and up to 500° F. temperature.

The boiler unit includes boiler feed pump and controls, fuel burner and combustion controls, heat exchanger





TOP RIGHT: Field testing is still in progress on a two-cone jet-type bit. This bottom view shows the relation of the jet nozzles to the cutting edges of the bit.
LOWER LEFT: Two-way jet wire line core barrel.
LOWER RIGHT: Close-up of two-way jet-type coring bit showing guide ribs on bit body.

and steam separator, all of which are permanently piped and mounted on one skid. The complete unit weighs 18,500 pounds, is 8 feet wide, 15 feet, 2 inches long, and 8 feet high with the stack removed. The boiler can be equipped with either natural gas or oil burners.

This type boiler has an assembly of five separate coils consisting of one water wall, an outer, intermediate, and an inner conical coil, and one drying coil, a total of 1827 feet of tubing, ranging in diameter from 1¼ inches up to two inches, and having 971 square feet of heating surface. It does not have a steam and water drum. Some of the advantages claimed by the manufacturer are safety from explosion, lightweight, quick rigup time, quick steaming, higher efficiency, and dry steam with a slight amount of super heat.

Field Installation

A field test is now in progress on a large steam rig using three Bettis boilers and four 150-horsepower standard oil field fire-tube boilers. The rig, which at this writing is drilling below 12,000 feet, has three 20-inch mud pumps, a 14- by 14-inch steam engine on the drawworks, and a 12-inch by 12-inch engine driving the rotary. While drilling, the rig has been using two 20-inch pumps compounded on the hole and one other 20-inch pump on the mud gun and hopper. The test indicates that the average steam demand has been 36,300 pounds per hour, and that two of these new boilers will carry the load while drilling, as compared with the four standard oil field boilers. One Bettis boiler is all that is required to go in the hole with the drill pipe, but it requires all three boilers to pull out of the hole. All three units are needed because of the large volume of steam required by the 14- by 14-inch drawworks engine operating at high speed and under heavy loads.

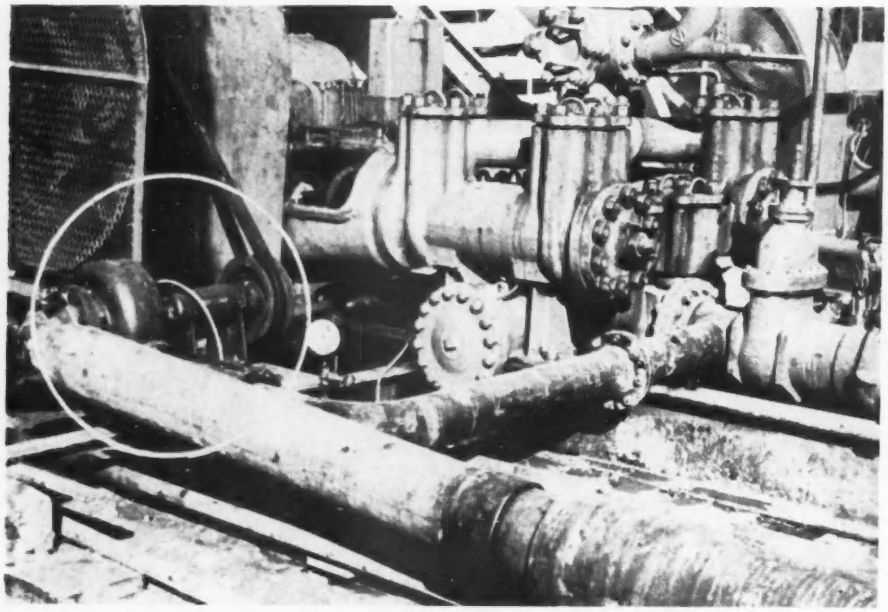
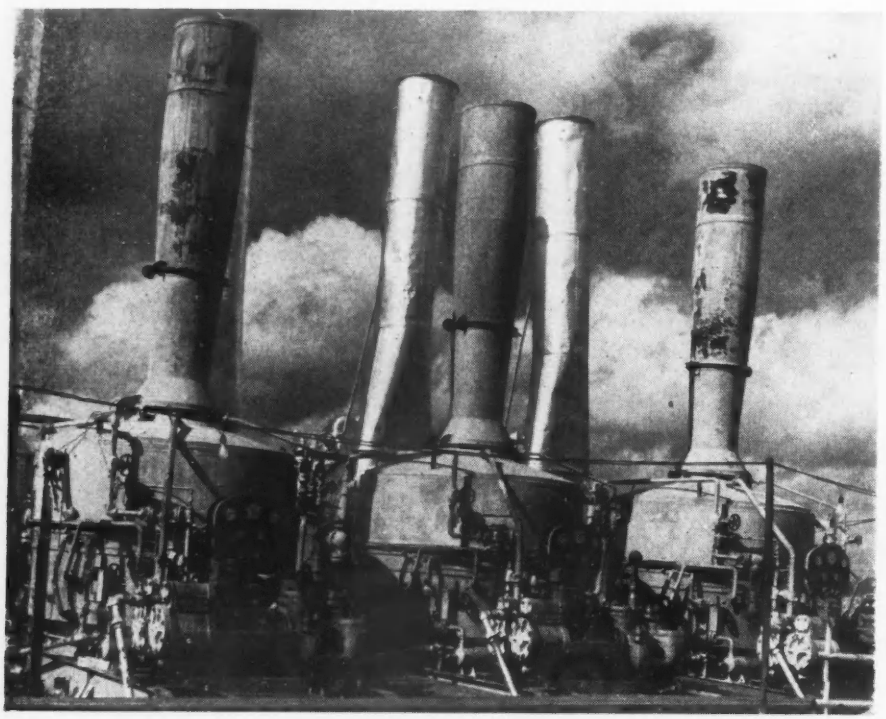


Photo courtesy Mission Manufacturing Company

Field installation test of the charged suction principle. Centrifugal pump driven by the main pump sheave is shown in the circle.



Front view of the new water-tube, coil-type boilers on test location. Boiler feed water pumps and controls are in foreground. Stacks in background are from battery of standard oil field locomotive-type boilers.

These field tests have also indicated that the new lightweight boilers are operating at 75 to 82 percent efficiency, whereas the standard oil field boilers are operating at 60 to 65 percent efficiency. Further, the Bettis boilers have consumed 17 to 30 percent less gas.

Boiler feed water for the new boilers is not now being treated, and the manufacturer is of the opinion that scaling of the tubes will not be a major problem due to the high velocity of the water and steam passing through the tubes. The boilers are acid-washed periodically, and a method has been devised to shot-blast the tubes to break up and remove the scale.

Due to the fact that the test has only been carried on for a comparatively short period, the information to date must be considered as preliminary and not conclusive. However, the boilers have been operating satisfactorily, and the results seem promising.

Drill Pipe Spinner

Another tool now being tested is a drill pipe spinner which eliminates the use of the spinning chain in making up drill pipe. The pipe spinner is powered by a six-horsepower air motor driving a drum inside the tool, and on which is wound a spiral spring steel tape. The tape is 4 inches wide, 1/20,000 inch thick, and 12 feet long for five-inch drill pipe and is less for smaller pipe. It has an abrasive material on one end which provides a grip on the pipe.

When going in the hole, the tool with the spiral spring extended is placed over the lower half of the tool joint before the stand of drill pipe is picked up. After the stand has been placed in the make-up position, the spinning tool is raised above the tool joint pin, and the tape grips the drill pipe, spinning it up as the tape is wound on the spinner

PENNSYLVANIAN SAND IN VELMA FIELD STEPHENS COUNTY, OKLAHOMA

Mud (Aquagel)
R_m = 0.85 ohm at BHT
Bit size: 9"
Spacings: AM = 16"
AM' = 64"
AO = 24'

LOG ANALYSIS

1) Water saturation S

Since R_o is unknown, the method described in "Electric Log Analysis in the Rocky Mountains" by M. P. Tixier, Oil & Gas Journal, June 23, 1949, will be used. Reprints are available from Schlumberger.

The 16" Normal gives 60 ohms. The 24' Lateral gives 160 ohms. With proper correction, from the 16" Normal we obtain R_i = 85 ohms, and from the 24' Lateral, R_t = 102 ohms.

Thus, $\frac{R_i}{R_t} = \frac{85}{102} = 0.83$

SP = –90 mv.

The chart below gives S = 14%

2) Formation water resistivity R_w

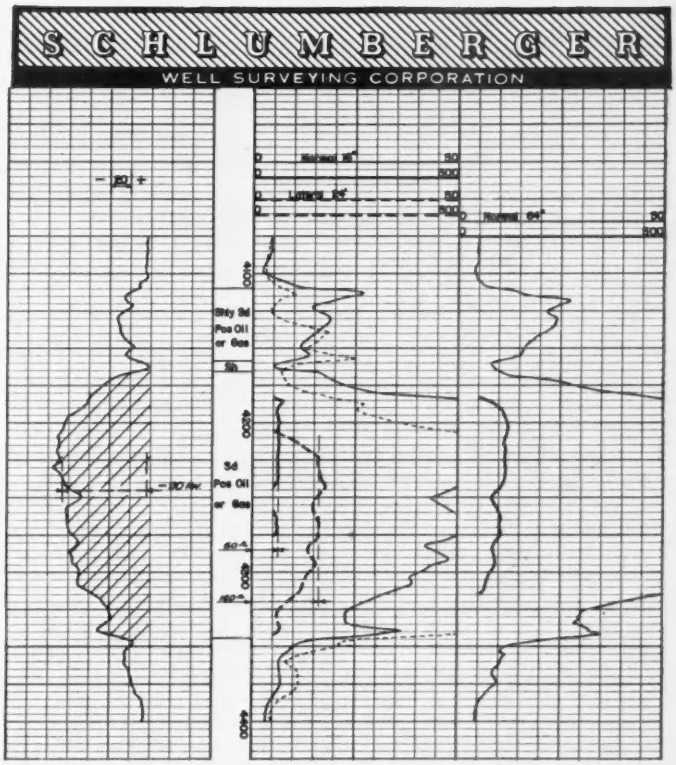
For SP = $-90 \log_{10} \frac{R_m}{R_w} = -90$ mv.

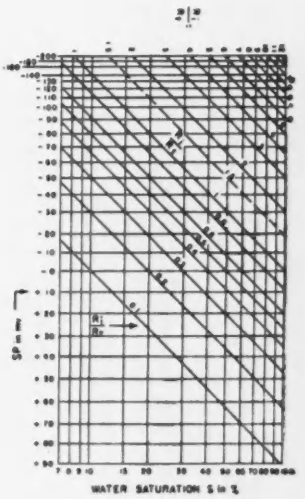
$R_w = \frac{0.85}{10} = 0.085$ ohmmeter

3) Porosity p

$R_t = \frac{F \times R_w}{S^2}$, thus $F = \frac{102 \times 0.14^2}{0.085} = 23.5$

$p = \sqrt[m]{\frac{1}{F}} = 20\%$ approximately m = 2





Procedure for calculation of per cent of water saturation (S).

CORE ANALYSIS

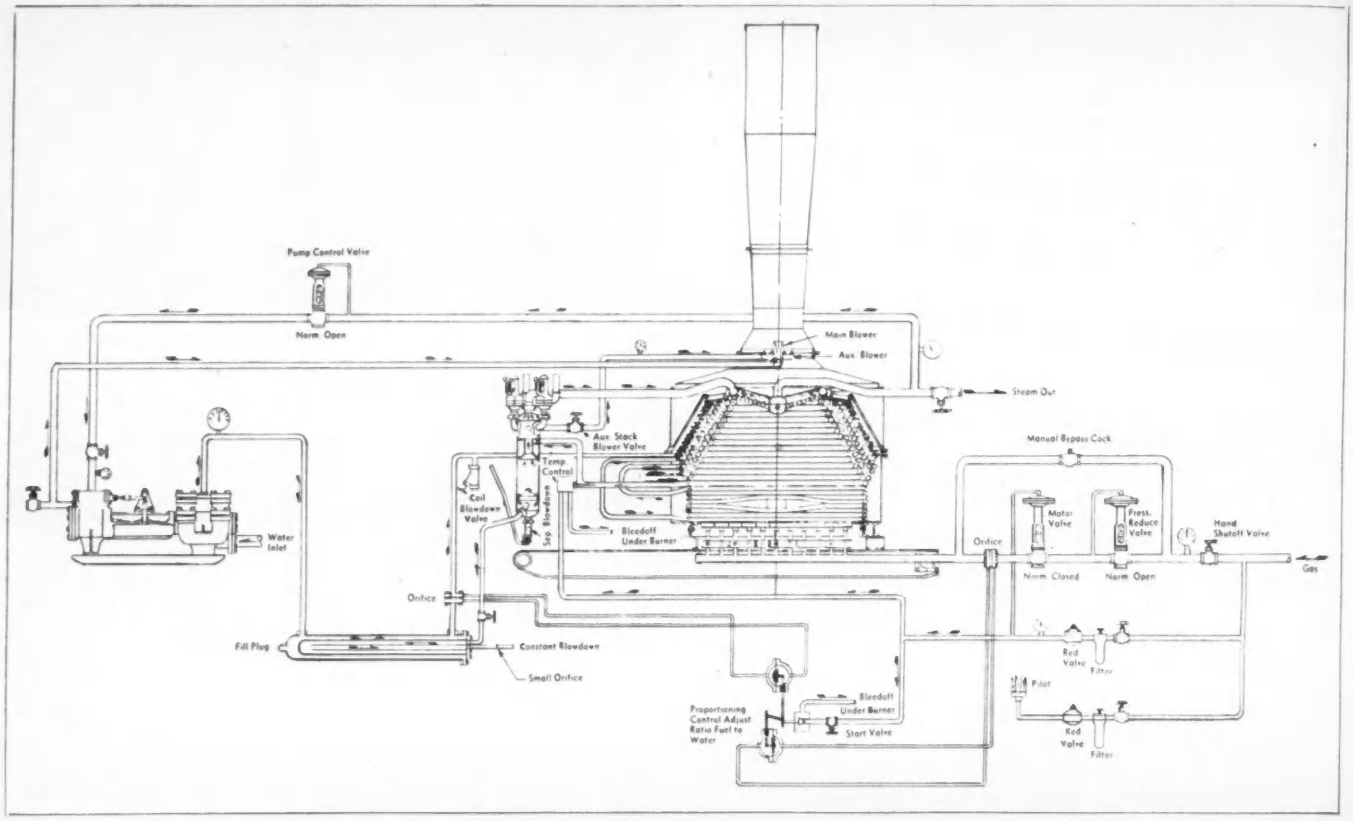
Average Porosity	19%
Average Permeability	108 md.
Connate Water by restored state methods	12%

PRODUCTION RESULTS

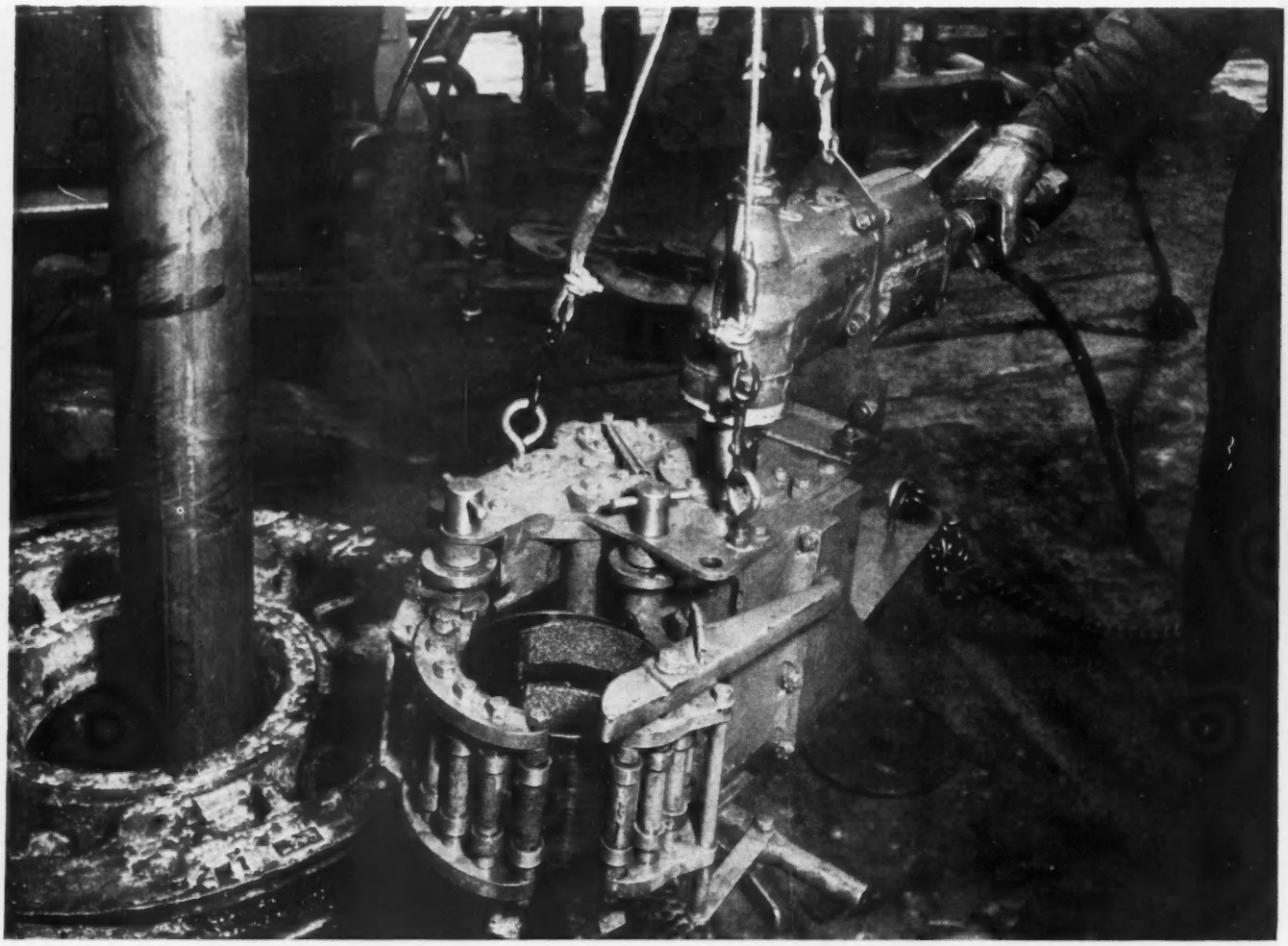
From North Offset Well (4200-4360)

Swabbed 1228 BO/21 hours
Pumped 151 BO/24 hours 28.5° API
Gas Oil ratio 139/1

SCHLUMBERGER
WELL SURVEYING CORP.
HOUSTON, TEXAS



Schematic diagram of the new coil-type water tube boiler.



New drilling equipment includes this air-powered drill pipe spinner used only to spin up the pipe. The joint is tonged up in the usual manner. Abrasive material on the spiral spring steel tape grips the pipe to make the spin.

All the Way!

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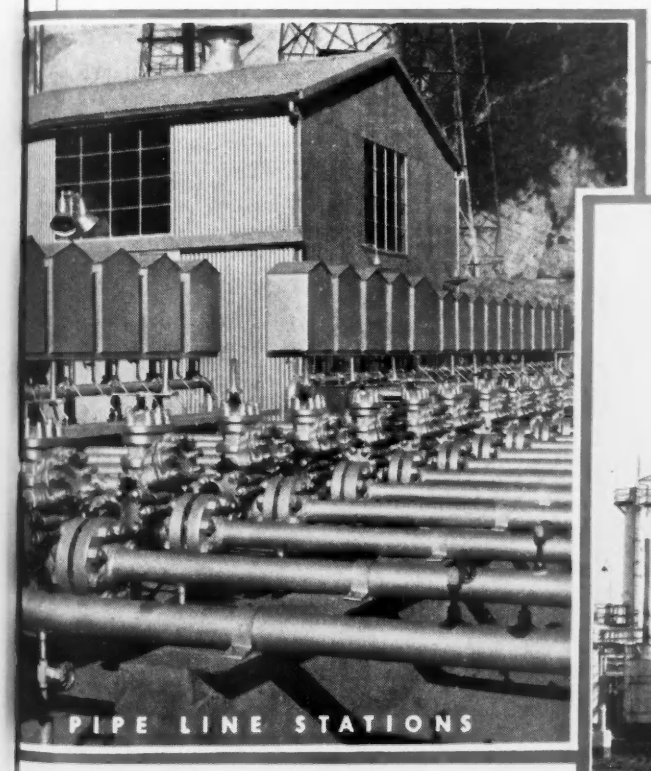
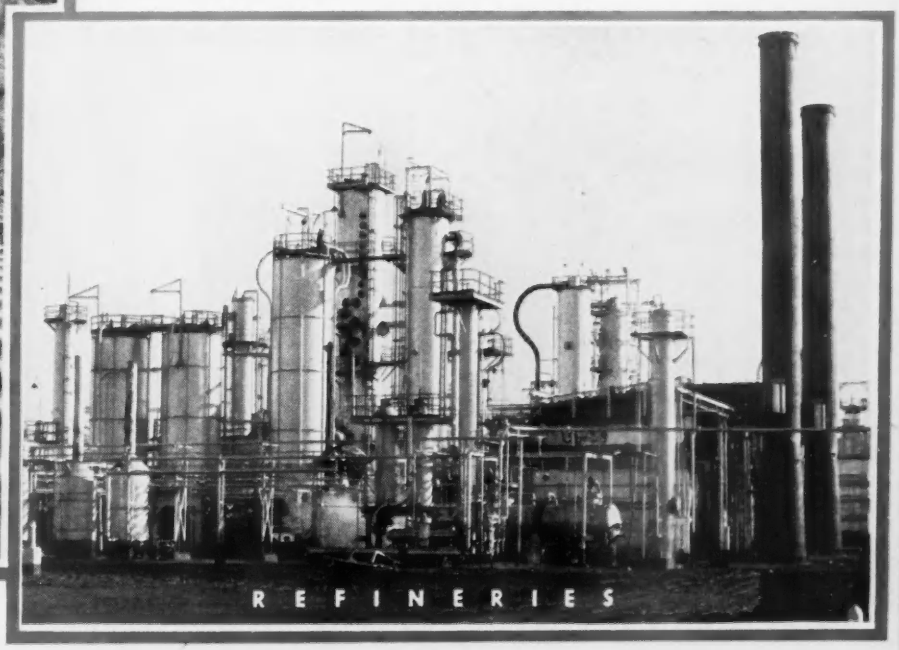


PIPE LINE STATIONS



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drum. The tool joint is then tonged up in the usual manner.

Rotary Mud Mixer

The rotary or propeller-type mud mixer that was in the experimental stage last year is now in production, and a number of these units are now in field use. It is recommended that the unit be powered with a 20-horsepower motor, turbine, or engine, which drives a conveyor screw and a 20-inch diameter by 20-inch pitch, three-bladed propeller. Speed of the propeller is 475 revolutions per minute. The mixer will adequately mix or stir a 400 to 500 barrel pit of 18-pound mud, and has a mixing capacity of 300 sacks of weighting material or 100 sacks of gel per hour.

Traveling Block Deflector

Most of the industry is familiar with the drill pipe handling equipment and automatic pipe tongs now being used on Humble Oil & Refining Company's experimental drilling rig. New improvements that have been recently placed in use are the traveling block deflector and the air-operated drill pipe elevators which permit the traveling block to move continuously while making a trip.

These new devices have allowed a considerable reduction in round-trip time, as well as further reducing the physical work of the drilling crew and improving operating safety.

Formerly, the traveling block and elevators were used to support the stand of drill pipe when it was being made up or broken out. In this operation, the remote-controlled pipe racker holds the pipe, making it possible to unlatch the elevators, and the block deflector permits the block to be moved up or down the derrick at the same time that the drill pipe is being broken out or made up. The drawworks and the slips are operated by the driller; the power tong operator also controls the lower racking arm. The power elevators and the block deflector are operated by another floorman. The block deflector mechanism consists of an eight-foot, air-operated piston which actuates the wire line that is reeved through a crown sheave, the carriage deflector sheaves, and the sheave on the side of the block. The line is anchored at the floor.

There are a number of other recent developments that have considerable merit but space does not allow their full discussion. Some of these are the adjustable casing stabbing board, the magnetic coupling, individual magnetic inspection units, traveling block overtravel safety devices, communication devices, and some changes in power pump construction. It can be stated that some of the recent developments are already effecting worthwhile economies for the industry, and other developments now under test offer very good possibilities.

ACKNOWLEDGMENT

For the information, data and illustrations furnished by numerous manufacturers and oil companies, the author is most grateful.

About the Author

EARLE C. HELLUMS, a native Texan, began work in the oil fields as a roughneck at Barbers Hill in the summer of 1930, and in the East Texas field in 1931. He graduated from Texas A. & M. College with a B.S. degree in Petroleum Engineering in 1932, and for the next 4½ years was with The Texas Company. In December, 1936, he joined Cron & Gracey Drilling Corporation and has since served the firm in various capacities, except 3½ years when he was in the Army. Since 1946, he has been vice president in charge of drilling operations for Cron & Gracey.

LEFT: Shop view of the propeller-type mud mixer set in a tank of clear water to show the construction of discharge tubes.
RIGHT: The travelling block is shown in the deflected position on its upward travel when going in the hole. Carriage on the monorail follows the block up and down the derrick. Tension in the connecting cables controls the deflection of the block.

Faster Performance Causes 13.3 Percent Decrease in

THE number of drilling rigs operated by the U. S. petroleum industry decreased sharply during the past year, despite an increase in amount of footage drilled.

The average number of rigs, cable and rotary combined, operated in 1949 was 4290 compared with 4950 in 1948, and 4738 in 1947. As compared with this 13.3 percent decline from 1948 in rig activity, there was a loss in 1949 of only 2.5 percent in number of wells completed and the amount of footage drilled rose 0.7 percent to a new all-time high. The drilling of more footage with a fewer number of rigs bears out surveys and statements which have indicated greater drilling efficiency on the part of contractors, especially in speed of penetration.

Rig activity failed to follow the normal seasonal trend last year. Whereas rigs running normally are usually at low levels in early months and then increase during spring and summer months to a peak in the fall, January was the high month last year and July the low point. This variation from usual seasonal trends undoubtedly can be attributed to the influence of production rates on the outlook of operators. There was a very close parallel between trends in production and rigs in use. As crude output was curtailed the number of rigs operating also declined and when production increased in the fall and early winter months more rigs were put into operation.

The 4511 rigs operating at the end of January last year declined steadily to a low point of 4015 in July, and then rose to 4485 at the end of November. The 4015 rigs at the end of last July were the smallest number since May, 1944. In 1948, the lowest level was reached in February, when 4542 rigs were in use, and a peak of 5229 rigs was reached at the end of October.

There were 38,534 wells completed and 137,625,712 feet of hole drilled by the industry in 1949, not including old

U. S. Drilling Rigs in Use During 1949, By States, By Months

Figures are for end of month, and include rigs drilling, rigging up, and temporarily shut down

STATE or DISTRICT	1948	1949											
	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Alabama	4	6	5	5	3	4	7	2	3	3	3	4	2
Arizona	8	8	6	6	6	6	7	6	5	4	4	4	3
Arkansas	37	30	30	25	32	35	27	27	31	30	27	26	25
California	259	295	263	267	256	267	232	232	265	247	254	227	206
Colorado	25	23	28	26	21	18	20	20	17	19	22	17	14
Florida	5	4	5	1	3	2	3	4	4	4	4	4	4
Georgia	....	....	....	1	1	1	1	1	1	1	1	1	1
Illinois	263	227	188	190	257	275	238	221	237	224	225	255	234
Indiana	119	122	132	129	134	137	151	156	139	157	135	143	138
Kansas	320	269	277	263	312	314	310	300	280	291	310	303	302
Kentucky	76	72	83	75	83	84	85	88	93	94	98	93	86
Louisiana	205	197	202	202	195	236	211	208	196	220	229	241	236
North Louisiana	61	61	55	60	52	71	58	69	60	78	86	82	75
South Louisiana	144	136	147	142	143	165	153	139	136	142	143	159	161
Michigan	109	104	95	106	103	130	120	123	136	123	142	140	135
Mississippi	37	35	36	31	31	26	23	28	33	29	32	38	34
Missouri	10	9	9	6	6	5	8	6	5	6	7	10	7
Montana	53	52	53	46	38	51	64	54	52	47	36	43	35
Nebraska	....	....	....	1	1	1	3	3	3	3	3	6	7
New Mexico	104	87	105	95	93	93	93	86	91	91	96	103	95
New York	179	148	157	146	121	109	97	72	103	86	80	95	105
North Dakota	1	1	1	1	1	1	1	3	3	2	2	1	....
Ohio	203	174	161	152	141	134	141	155	164	162	154	169	152
Oklahoma	501	474	489	484	482	486	461	457	499	509	523	545	540
Pennsylvania	391	344	338	327	291	241	239	208	264	248	229	248	245
South Dakota	2	2	2	2	1	2	2	2	3	2	2	2	2
Tennessee	9	10	10	7	9	6	6	6	6	6	7	7	7
Texas	1,492	1,366	1,368	1,362	1,245	1,260	1,209	1,209	1,150	1,314	1,295	1,384	1,398
Dist. 1—South Central	39	42	44	41	44	43	37	34	34	37	35	39	33
Dist. 2—Middle Gulf	46	50	59	65	46	45	35	49	50	48	51	51	43
Dist. 3—Upper Gulf	135	143	144	146	144	137	123	114	110	120	115	136	125
Dist. 4—Lower Gulf-S.W.	122	127	130	115	101	106	95	96	98	94	95	100	111
Dist. 5—East Central	28	33	26	29	17	16	16	21	15	21	29	24	21
Dist. 6—Northeast	41	35	33	35	34	42	34	49	41	36	48	43	42
Dist. 7-B—North Central	235	199	194	198	164	159	177	170	160	196	188	175	167
Dist. 7-C—West Central	80	74	66	53	51	57	50	61	82	87	83	86	90
Dist. 8—West	449	404	401	408	397	393	377	365	324	378	372	459	479
Dist. 9—North	147	125	134	135	129	135	153	150	140	176	169	173	181
Dist. 10—Panhandle	170	134	137	137	118	127	112	100	96	121	110	98	106
Utah	11	13	14	14	16	18	15	15	14	10	13	12	8
Virginia	....	....	....	....	....	....	....	....	....	....	1	1	1
Washington	....	....	....	....	....	....	....	....	....	....	1	1	....
West Virginia	362	336	317	302	284	240	224	228	231	246	222	256	242
Wyoming	123	113	116	96	99	94	99	95	90	80	90	106	91
Total United States	4,908	4,511	4,490	4,368	4,265	4,276	4,097	4,015	4,118	4,258	4,247	4,485	4,355

wells drilled deeper but including input and disposal wells. On the basis that an average of 4290 rigs were utilized in 1949, each rig completed nine wells and drilled 32,000 feet of hole during the year.

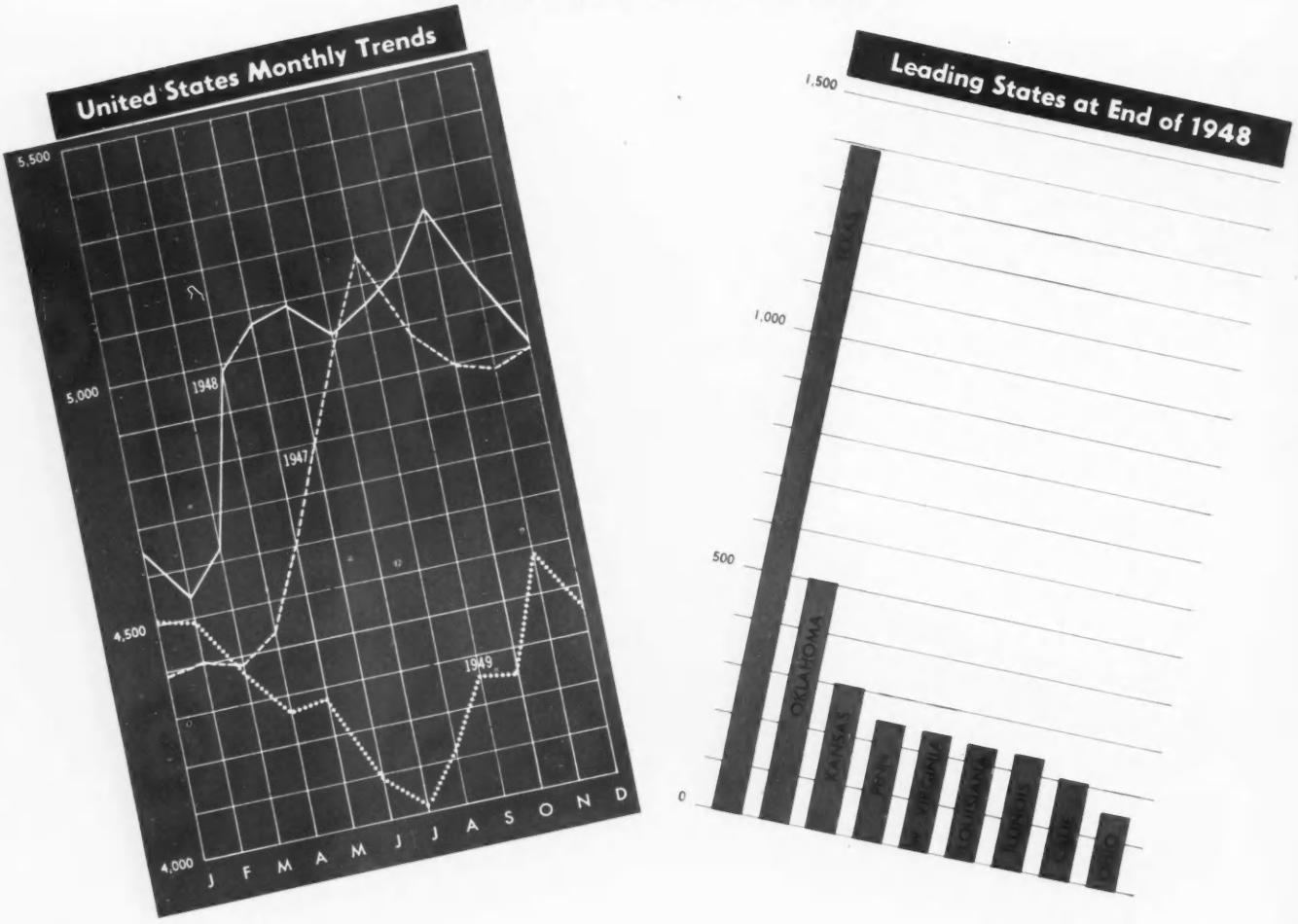
At the end of 1949 there were 4355 rigs operating in contrast with 4908 at the end of the previous year. Most states had fewer rigs active at the end of 1949 than at the close of 1948.

Among the more active drilling regions, Louisiana, Oklahoma, Indiana and Michigan were the only ones to show an increase in rigs running. Louisiana had 235 rigs operating on December 31, 1949, an increase of 31 from a year ago. The number of rigs in Louisiana was but six under its peak for the year, and also was higher than at any time during 1948. Oklahoma's 540 rigs represented a gain of 39 over the end of 1948. At the close of the year Indiana had 138 rigs operating, up 19 from a year previous. Michigan had 135 rigs at the end of 1949, a growth of 26 over December 31, 1948.

Sharp decreases in active rigs occurred in California, Texas and the Eastern states between the end of 1948 and the close of 1949. Rigs in California, an area troubled throughout the year with excessive stocks and production, experienced a decline of 53 rigs with only 206 running. Texas dropped to 1398 rigs, a loss of 94. Pennsylvania had only 245 in contrast with 391 a year ago. West Virginia was off from 362 to 242, New York from 179 to 105, and Ohio from 203 to 152.

Smaller decreases in rigs running at the end of the year occurred in Illinois, Kansas, New Mexico, Montana and Wyoming.

Drilling Rigs Operating in United States



Drilling Rigs in Use in U. S., by Years, by Months

Figures are for end of month, and include rigs drilling, rigging up, and shut down

YEAR	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1938	3,968	3,928	3,973	3,971	3,582	3,830	3,737	3,869	3,742	3,876	3,676	3,434
1939	3,583	3,391	3,448	3,630	3,695	3,726	3,567	3,718	3,625	3,905	3,981	3,924
1940	3,990	4,277	4,472	4,327	4,655	4,502	4,235	4,194	3,821	3,921	4,030	3,894
1941	3,814	3,952	4,121	4,287	4,335	4,598	4,819	4,984	4,693	4,672	4,746	4,336
1942	3,816	3,067	2,979	2,859	2,868	2,905	3,179	3,007	2,953	3,094	2,962	2,797
1943	2,691	2,653	2,732	2,756	2,743	2,852	3,015	3,201	3,031	3,548	3,676	3,595
1944	3,427	3,568	3,702	3,819	3,934	4,278	4,411	4,528	4,566	4,738	4,665	4,640
1945	4,270	4,154	4,159	4,374	4,637	4,394	4,424	4,289	4,356	4,521	4,426	4,637
1946	4,337	4,229	4,212	4,405	4,399	4,124	4,235	4,201	4,474	4,410	4,551	4,654
1947	4,390	4,402	4,379	4,470	4,603	4,802	4,992	5,163	4,979	4,897	4,871	4,945
1948	4,699	4,542	4,626	4,989	5,067	5,090	5,013	5,058	5,116	5,229	5,060	4,908
1949	4,511	4,490	4,368	4,265	4,276	4,097	4,015	4,118	4,258	4,247	4,485	4,355

Specifications of Ford Industrial Engine Power Units

Model	Cyl-inders	Bore and Stroke	Displ. cu. in.	Dyn. B.H.P.	Max. Torque	Equipment Available
120	4	3⅜ x 3¾	120	38 @ 2400	92#' @ 1600	Clutch; SAE #5 housing; power take-off; Ford housing; 3- or 4-speed transmission; governor. (Available as closed type power unit or engine assembly.)
226	6	3.3 x 4.4	226	80 @ 2400	182#' @ 1200	Clutch; SAE #3 or #4 housing; power take-off; Ford housing; 3-, 4- or 5-speed transmission; governor. (Available as closed or open type power unit, or engine assembly.)
239	V-8	3⅜ x 3¾	239	85 @ 2400	187#' @ 1600	Clutch; SAE #3 or #4 housing; power take-off; Ford housing with 3-, 4- or 5-speed transmission; governor. (Available as closed or open type power unit, or engine assembly.)
254	6	3.5 x 4.4	254	95 @ 2400	212#' @ 1200	Clutch; SAE #3 or #4 housing; power take-off; Ford housing; 3-, 4- or 5-speed transmission; governor. (Available as closed or open type power unit, or engine assembly.)
337	V-8	3½ x 4⅜	337	117 @ 2400	257#' @ 1600	Clutch; 5-speed direct-in-fifth transmission; overdrive transmission, direct drive power take-off. (Available as closed or open type power unit, or engine assembly.)

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DRILLING HINTS

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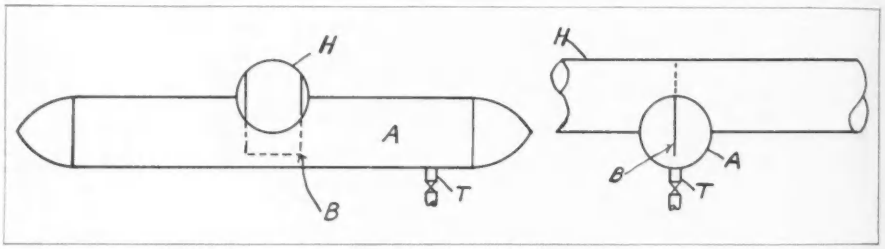
HOW TO—Prevent Steam Line Water-Slugs

On a long steam line, especially during the colder months, even careful insulation cannot prevent condensation from forming in the line, and the resulting slugs of water being carried through the line at high speed when pump or drawworks throttle is opened.

To assist the separator by removing the worst of these slugs before they reach the fittings necessary for its installation, a short section of steam line, both ends with orange-peeled closures, is cut into the lower surface of the steam line, horizontally and at right angles to it. In the sketch, "H" is the steam main, with the interceptor "A" welded to it and the pipe walls common to both cut away inside the welds. A baffle plate "B," welded to the inside of the steam main before the cross members is placed, is formed so as to project nearly to the lower surface of "A" when it is welded in place.



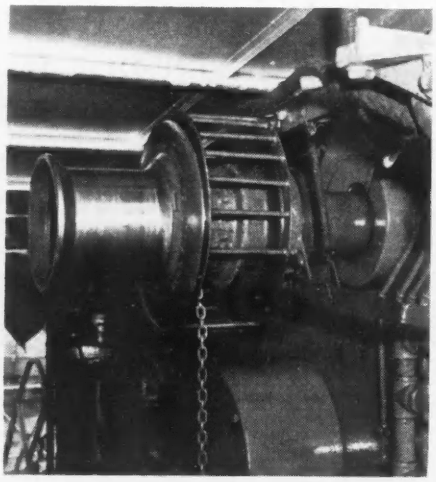
Slugs of water traveling along "H" strike the baffle plate, and are deflected into the cross member, settling to the bottom and being withdrawn through the trap fitting "T" as they accumulate.

The baffle plate not only removes most of the entrained water, but also serves to deflect and cause to be trapped in the cross member any sludge or scale which may form within the steam main. By setting this unit as close to the first point of live steam withdrawal, it is frequently found possible to eliminate the use of a more complicated separator.

HOW TO—Add Safety Apparatus to Cathead

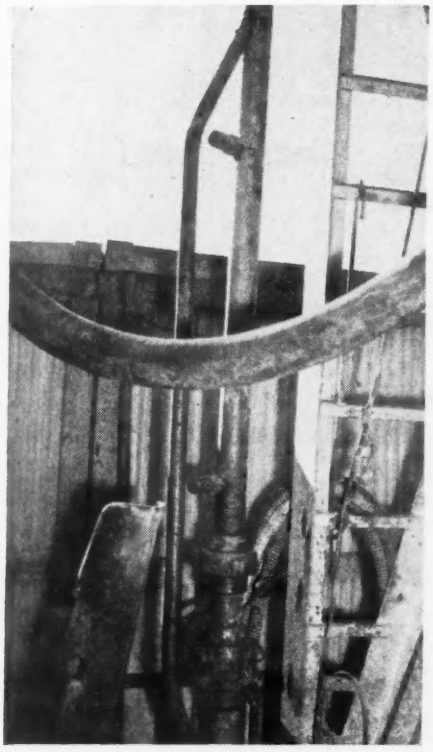
Accident reports indicate that more men are injured by the cathead than possibly any other piece of equipment on the drilling rig. Automatic catheads eliminated the need of a cathead operator in making up and breaking out drill pipe. However, they did not reduce the hazard of this equipment for other uses.

The automatic cathead illustrated has been equipped with a tonging chain rather than wire line for several reasons, outstanding among which are better payout on unwinding and longer wear. A distinct disadvantage in using chain is its tendency to loop over and ride on the exposed cathead on the end of the shaft. There is danger, too, that if a joint is being made up and the fireman is catheading singles from the pipe rack onto the derrick floor at the same time, he may be hit by the unwinding chain as it spins off the automatic cathead.



These dangers have been eliminated by enclosing the automatic spool by a cage made of rod steel. The cage is the same width as the cathead spool, and is anchored at top and bottom to the stationary cathead housing. Steel rods have been welded at two-inch intervals around the end pieces, except at the lower front side where the chain pays out. This cage prevents the tonging chain from looping over onto the end cathead, and also removes chance of the catline's traveling over the cathead flange onto the automatic cathead spool.

HOW TO—Guard Hose on Small Rig



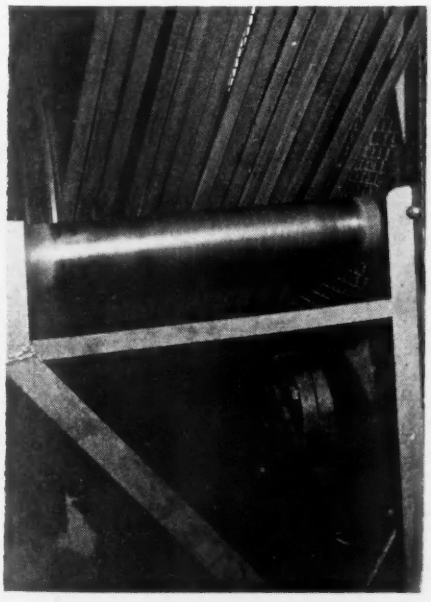
Much equipment must be located and operated on the small derrick floor of a lightweight drilling rig. Where the cantilever is used and standpipes are mounted inside the derrick, the floor area is very crowded. As each joint of pipe is drilled down and a new one added to the string, the rise and fall of the rotary hose must be observed carfully to see that it does not hang on a piece of equipment.

The mud standpipe illustrated is coupled to the mud pressure line by a union, below which is located a three-inch mud valve. Above the union are two widely-spaced 1¼-inch bull plugs screwed into collars welded to the standpipe to accommodate auxiliary piping or mud pressure gauges.

To prevent the rotary hose from hanging on any of these fittings, a railing spanning the obstructions was welded to the standpipe. It was made from two-inch piping and welded at angles at each end so the hose would slide over the rail as it traveled up and down in the derrick. The railing is far enough away from the standpipe not to interfere with coupling the fittings it spans.

HOW TO—Prevent Belt Drive Whip

When power transmissions are anchored to an elevated substructure with the main engines 12 or 14 feet above ground level where mud pumps are located, long V-belts are required to connect the drive pulley with the pump shaft pulley. Due to the pulsating action of twin cylinder, duplex mud pumps, there is a tendency for the belts to whip or slap, which, if permitted to go unchecked, would shorten their useful life.

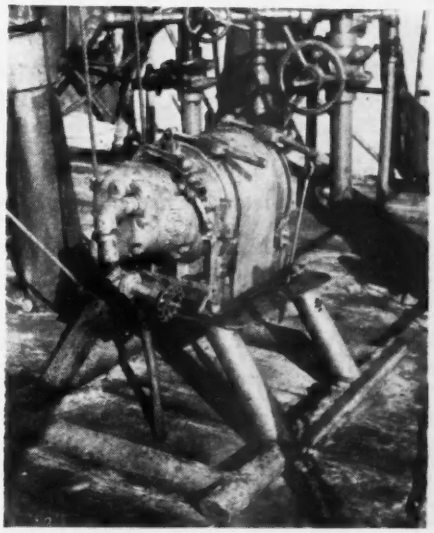


Much of this whipping action can be eliminated by incorporating a supporting roller into one of the V-belt guard brackets. The three-inch roller shown was mounted at each end in roller bearings equipped with alemite fittings on an angle iron frame. This frame was bolted to the mud pump skid at the bottom. The supporting frame was also bolted at each end to the V-belt guard frame at the top.

It was necessary to install such a guard support in this case, and the roller was included to eliminate much of the V-belt whip. The support was made adjustable where it bolted to the mud pump skid so that it could be raised or lowered to compensate for stretch in the belts.

HOW TO—Perform Cathead Jobs With Hoist

Inasmuch as the cathead has proven through past experience to be somewhat dangerous, performing as much of its work as possible with other means will reduce the possibility of an injury. Substituting for the cathead in a number of ways is this air-driven, single drum utility hoist. Rated at one ton with 80 pounds air pressure, this hoist can be used for work normally done with the cathead. Such jobs as pulling in singles of drill pipe, lifting subs to the floor, setting back the Kelly, and others, can easily be performed with this tool.



The hoist has been mounted on a skid platform made of three-inch pipe and bolted solidly to the derrick floor. It is located near the far corner of the floor diagonally from the driller's position so that in using the hoist, the operator has full view of everyone on the floor as well as on the pipe rack and V-ramp. Experience has shown that the hoist does not perform as well with steam pressure as it does with air, and for that reason, its use has been mainly confined to power rigs equipped with adequate air-compressing capacity. The hoist has two hand controls: an air throttle valve and a hand brake. The drum has a capacity of 350 feet of half-inch wire line.

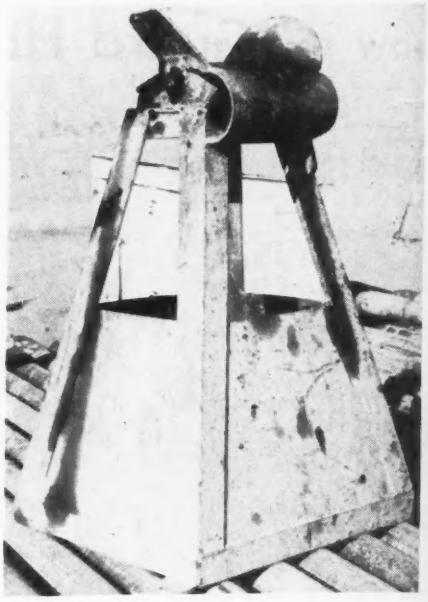
HOW TO—

Make Drill Pipe Lay-Down Roller

When laying down a derrick full of drill pipe a special device has been found to be quite helpful. It is made with an angle iron frame in the shape of a truncated pyramid, with angle iron footing and sheet steel braces between the legs. The top has a crown of sheet metal in the form of an ellipsoid and is welded to the four vertical posts.

A gusset plate on each end carries bearings to support a free running roller, the top of which just clears the upper side of the oval guide, or top section. At each side of the crown are two flaring retainers, resembling the cantle of a stockman's saddle.

The device is placed on the walk between the pipe racks in position to permit the lower end of the stand of drill pipe to pass over and rest upon the free running roller. Pipe can be lowered without hooking to the high line and the joints



slide easily and quickly to the racks without damage.

HOW TO—

Fabricate Pry-Bar For Shifting Pipe

The job of shifting stands of drill pipe standing on the derrick floor frequently is done with the aid of a crowbar, or in some instances with a 36- or 48-inch pipe wrench. Realizing the inadequacy of makeshift tools, or those devised and improvised on the job, some crews are finding that an efficient pry-bar can be made of the worn and salvaged heeljaw of a 36-inch pipe wrench, the shank of the jaw being inserted and welded into the end of a four-foot length of pipe. With this leverage, the man can "work" a stand of drill pipe into place by hooking the jaw under the edge of the tool joint and prying back.

To give additional stability to the tool, a short bar of steel approximately two inches long is welded across the back of the jaw as illustrated. This bar reduces the tendency of the jaw to fall to one side when the load is taken on the tool.

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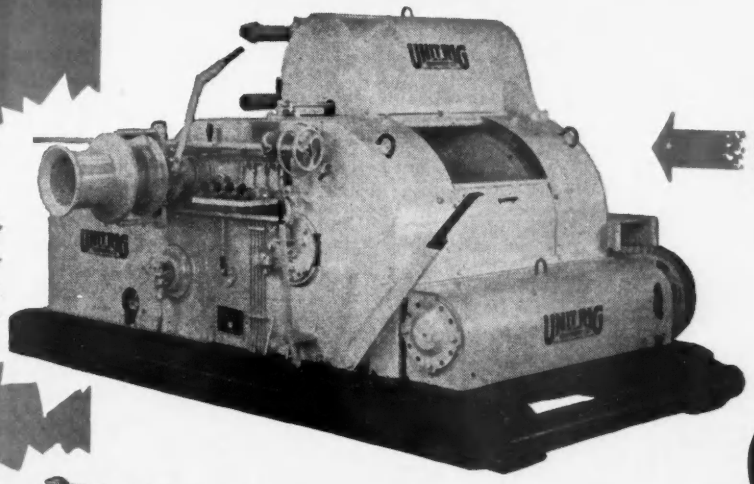

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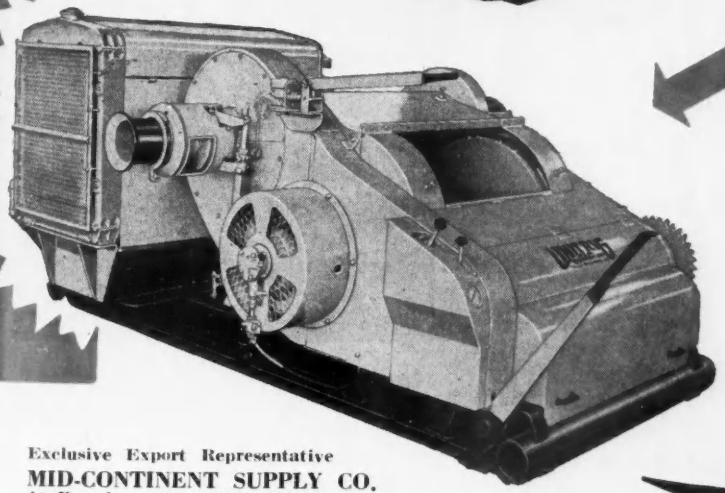

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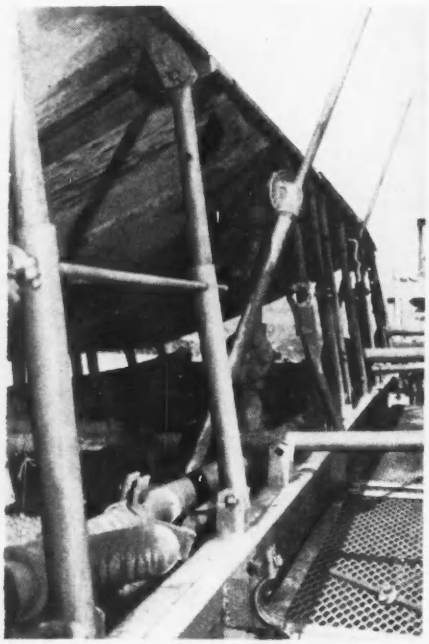
HOW TO—Support Protective Cover Over Mud Tank

Heavy rains into open mud pits can change the physical characteristics of the drilling mud. To insure accurate control over mud weights, viscosity, etc., a metal cover was added to the tanks shown. The cover over this pit was made in three sections so that two men could adjust the height of the open side.

Each cover was hinged to the mud tank to permit operation of the mud guns used to agitate the fluid in the pit. Far side of the cover has fixed hinges while the front side is equipped with an adjustable support. The supporting legs are telescoping sections of pipe hinged at top and bottom to brackets welded to the cover and the tank respectively.

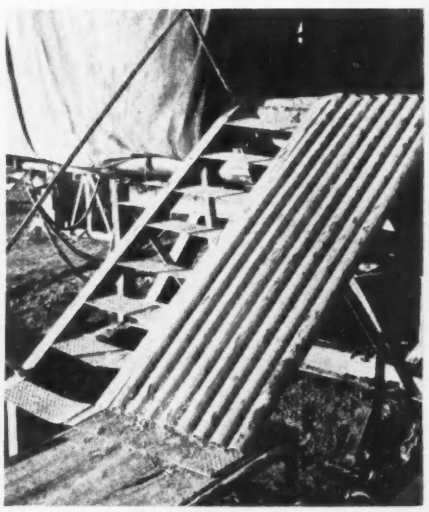
Holes have been drilled into both telescoping members so that a steel rod can be inserted through the matching holes when the cover has been raised to the desired height. One rod passes through four supporting legs. During moves, these legs can be disjointed so that the tank covers lay flat. Each telescoping section is pulled out and pushed inward as the lid is lowered. Securing rods can be carried in the tank. By pulling the pins on the fixed hinges, the cover can be removed entirely, if desired.



HOW TO—

Use Salvaged Pipe To Construct Ramp

Numerous ideas have been devised for improving the ramp between the walk and derrick floor, each modification having a desirable element that represents an improvement over the conventional ramp made of heavy planking. One drilling company has found that a rack made of split sections of salvaged drill pipe, as in the installation pictured, has given the greatest and most satisfactory service; one that requires a minimum of service or upkeep. The ramp shown is 8½ feet long and is made of half-sections of 4½-inch drill pipe welded together side by side. Attached to the side of the ramp is an all-steel stairway, the outer leg of



which rests on the ground. The sides of the stairway are of four-inch angle iron.

The operator reports that the grooves between the pipe sections causes pipe to hold a straighter course when drawn up into the derrick or lowered to the rack. The pipe sections, being of heavy drill pipe, will give long and dependable service. The combination unit is moved, transported and re-installed at the new location with a minimum of time and effort.

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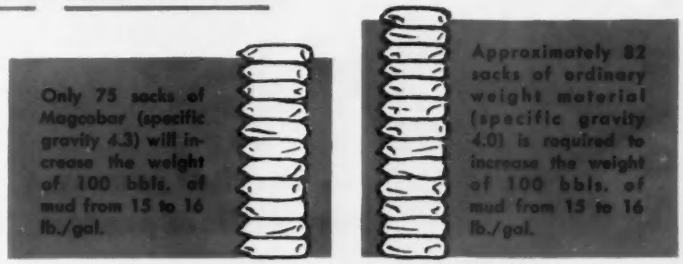
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HOW TO—

Make Platform for Cathead Operator

When employing the cathead to pull equipment and supplies onto the derrick floor, or to make up drill pipe, the operator must be at a convenient height or the hazards of this operation are increased. A small elevated platform at the cathead can be of indispensable aid to the operator on smaller rigs where the derrick floor is not completely level.

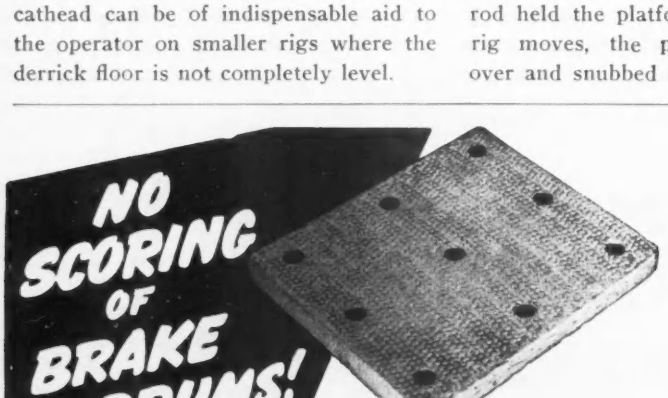
On the rig illustrated, the drawworks was skidded into place on top of the substructure, and both surfaces were floored over with floor plate steel. There was a difference of 12½ inches between the two levels, the difference being a disadvantage to the cathead operator who had to reach high to control the catline. To make this operation safer and more convenient, a hinged platform was attached to the drawworks skid as shown.

The small elevated platform was 4 feet by 26 inches and was made of two-inch angle iron. It was covered by heavy expanded metal tack-welded to the frame. Legs made of floor plate were welded to the angle iron. The platform was attached to the drawworks skid by a hinge which made it possible to turn the unit over so that it lay face down on the skid flooring. Three small tubular pieces were required for each hinge, two of the pieces welded to the skid and the third welded to the platform so it slipped between the two shorter pieces. A steel rod held the platform in place. During rig moves, the platform was turned over and snubbed in place.

HOW TO—

Avoid Pump Trouble In Early Drilling

The first batch of mud circulated in a new well often is contaminated with bits of weeds, brush and small hard-packed clods of earth, any of which might stick a valve seat or otherwise affect the smooth operation of the pumps and mud system. One drilling contractor equips his suction line with a special strainer



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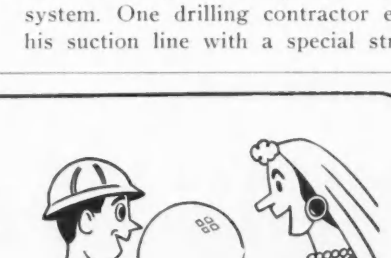

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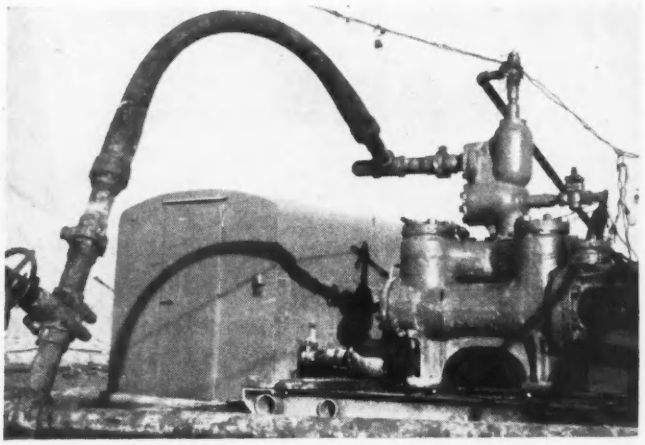
during the initial part of the drilling operations, or at least until he is assured that the ditches are cleaned. The strainer shown consists of a 24-inch length of 8⅝-inch casing closed at both ends and perforated with torch-cut slots.

Welded into a hole cut in the center of the section is a short nipple of 10¾-inch pipe which is slipped over the end of the suction line and secured by four ¾-inch bolts spaced at intervals around the circumference of the nipple. The large surface area of the strainer assures ample passage for mud and permits initial drilling operations to commence with little fear of the mud system becoming clogged. After the mud ditches have cleaned up the strainer usually is removed and laid aside until used on the next location.

HOW TO—Affix Pump to Mud Line



A practice meeting with increasing favor among West Texas drilling contractors consists of connecting the mud standpipe line to the pump discharge in the manner illustrated. There are several reasons for making such a practice desirable. A relatively short length of rotary hose is required, which represents a saving in initial outlay, and the hose escapes the wear it would suffer laid on the ground or rough planking and subjected to pump discharge vibrations. In addition, with this type of connection, pulsations which do occur tend to be dampened or at least reduced in amplitude before they reach the standpipe line connection. While it may require slightly more effort to lift the hose into position for making up the unions, this is offset by the initial savings in cost and the operating advantages realized.

HOW TO—Provide Bench for Samples

A discarded wire line spool, usually an item that is either discarded or laid aside for possible re-use in storing of used line, may be put to excellent use by the geologist or man in charge of mud testing and sample taking. As shown, the spool is laid on one side and positioned in a central point in the yard area, preferably near the mud ditch and shale shaker. The top surface provides a convenient working area for sacking and drying samples and running mud tests. Sample bags are hung on nails driven into the core of the spool, this method of storing offering several possibilities for keeping them in proper sequence. Sample bags are thus protected from contamination which might occur if they were laid down on a dirty surface, and are easily counted and recorded.

A length of two-inch pipe thrust through the center of the spool provides a convenient pole on which to fasten an overhead light which gives adequate and virtually shadow-free light regardless of the side of the bench on which the man may be working.

19,889 Wells to Require

By ELTON STERRETT
Engineering Editor

DURING 1950, an estimated 19,889 oil wells will be equipped with some type of lifting equipment. Surface units with down-the-hole pumps will produce a large portion of this total, but a substantial percentage will be equipped with air or gas lift, and still others will use hydraulic, down-the-hole electric, and other powered types of fluid lifting equipment. On the basis of last year's number of wells equipped with artificial lift, a drop of 187 from the 1949 total of 20,076 is shown, this being slightly less than the indicated drop in completion of producing wells as forecast for 1950.

Factors entering into the determination of probable pumping equipment needs for each area shown in the accompanying table include the anticipated number of oil producing wells for the coming year; probable retarded rate of swing from the flowing to the pumping column of many wells, due to the reduced drain on reserves as influenced by the cutbacks imposed on the industry during 1949; an added year of reservoir flow stabilization following the excessive production rate of the war years; and the return to the flowing lists of many wells which had been produced by pumping but which, through the application of effective water-flood operations, are again flowing.

Much of the change-over from pumping to flowing wells is occasioned by drilling being stepped up in areas where flowing production is encountered. This concentration of drilling effort has cut

Estimate of 1950 Pumping Equipment Needs

(Includes requirements for all types of pumping units and also air/gas lift units)

STATE or DISTRICT	Estimated Number Wells To Go on Pump or Air/Gas Lift During 1950	Wells Put On Pump or Lift in 1949	Oil Wells Completed In 1949	Number of Flowing Wells End Of 1949	Number of Net Wells Abandoned or Shut in During 1949	Estimated Average Number Pumping Wells To Be Maintained During 1950	Estimated Maintenance Cost (Equipment Only) For All Pumping Wells in 1950
Arkansas	218	220	171	291	184	3,185	$ 303,000
California	1,418	1,572	1,809	2,373	3,858	22,836	8,563,000
Colorado	45	41	15	87	†10	707	88,000
Illinois	1,258	1,370	1,383	71	462	31,798	2,703,000
Indiana	482	480	497	35	†7	3,980	299,000
Kansas	1,506	1,584	1,503	62	†2,474	29,886	2,989,000
Kentucky	392	365	365	0	24	15,091	1,283,000
Louisiana	1,225	1,395	1,348	3,320	211	7,831	851,000
North Louisiana	1,053	1,243	831	548	197	6,385	670,000
South Louisiana	172	152	517	2,772	14	1,446	181,000
Michigan	341	324	415	387	187	3,438	361,000
Mississippi	159	162	143	476	13	965	149,000
Montana	119	123	138	39	398	2,925	351,000
New Mexico	687	604	330	3,014	699	2,852	713,000
New York	472	560	560	0	760	23,036	921,000
Ohio	325	349	344	60	1,554	21,902	1,090,000
Oklahoma	2,400	2,428	2,474	1,426	1,225	54,134	5,413,000
Pennsylvania	672	724	724	0	1,024	84,036	3,151,000
Texas	7,867	7,481	8,663	39,122	3,455	79,577	10,065,000
Dist. 1: South Central	207	205	236	277	112	3,385	416,000
Dist. 2: Middle Gulf	185	195	295	3,066	61	1,151	165,000
Dist. 3: Upper Gulf	864	839	763	4,816	290	4,823	593,000
Dist. 4: Lower Gulf-S.W.	544	555	645	4,181	340	5,769	799,000
Dist. 5: East Central	74	74	83	388	52	1,450	223,000
Dist. 6: Northeast	768	771	687	13,486	568	12,134	2,305,000
Dist. 7-B: North Central	866	818	927	1,249	554	6,908	1,105,000
Dist. 7-C: West Central	178	184	335	438	49	1,697	261,000
Dist. 8: West	2,101	1,778	2,461	10,152	448	14,567	1,092,000
Dist. 9: North	1,456	1,371	1,544	1,050	711	20,299	2,182,000
Dist. 10: Panhandle	624	691	687	19	270	7,394	924,000
West Virginia	102	89	89	0	389	15,951	877,000
Wyoming	175	183	331	484	†47	4,529	567,000
Other States[1]	26	22	50	27	6	202	16,000
Total United States	19,889	20,076	21,352	51,254	11,911	408,861	$40,753,000

[1] Other States include: Alabama, Florida, Missouri, Nebraska, Tennessee, Utah and Virginia.
States marked (†) showed more shut-in wells again put on production than total abandonments. Figure shown represents surplus of formerly inactive wells put on production over actual number of abandonments.

into the number of wells normally added to the backlog of producing properties which, initially flowing, have heretofore been expected to break over into the pumping lists in numbers considerably exceeding the area's number of wells completed during a calendar year.

Company data on requirements for surface units only—no figures being requested on down-the-hole equipment—indicate that their purchases will exceed 1949's by 9 percent. Inasmuch as wells indicated to go on the pump during 1950 are down slightly from 1949, and as drilling trends are toward areas with flowing production, the increased purchases during 1950 may be taken as evidence that the stocks of equipment which slowed the sale of new units during 1949 have been materially reduced.

Only two districts, New Mexico and Texas R. R. District 8 (West Texas) indicate marked increase in pumping unit demand over the requirements for 1949. In West Texas there is evidence that the backlog of flowing wells is rapidly being converted to pumping, with the same effect being apparent in New Mexico, though to a lesser degree.

Shut-ins and Abandonments

The survey indicates that there will be 11,911 net wells either abandoned or shut-in during 1950. This compares with 10,426 thus inactivated during 1949. However, the recall to active production of wells idle in 1949 is noteworthy in Kansas, where the number of wells called back into service topped the abandonments by 2474. Much of this renewed activity, of course, is due to vigorous water-flood operations, and many of these wells will require pumping equipment to bring the additional production to the surface. It is estimated by companies active in water-flooding operations that at least 40 percent of these wells will require replacement or overhaul of existing pumping units. Some of these water-flood wells are being so successfully operated that they have changed from the pumping to the flowing column, and thus are not, at this time, in need of surface equipment. Most of them will ultimately be placed on artificial lift before reaching the end of their water-flood life.

California, Montana, New Mexico, Ohio, Pennsylvania and West Virginia, by showing more abandonments than oil well completions for 1949, indicate that they are falling behind all the other subdivisions listed in adding to the nation's active oil wells. In some instances these wells are not abandoned permanently, but may be revived, or activated as gas- or water-input wells in case they are advantageously situated for such operations.

Maintenance Costs

There are several instances where maintenance costs for 1950 are indicated to be greater than in 1949, though the effect of reduced production as a result of cutbacks is evident in extended operating life and lessened maintenance costs in some areas. The average number of wells to be maintained in each area is determined by taking the number of wells on the pump at the beginning of the year, and adding one-half the number of oil wells indicated by the drilling survey to be completed during 1950. This total is then shaded to recognize the fact that completions during the second half of a normal year are about eight percent higher than during the first six months. Further weight is given the trend of an area toward flowing or pumping production, and this factor evaluated in the terms of possible maintenance requirements.

There are, of course, some pumping wells which will require no maintenance during 1950, especially those equipped during the latter months of the year, but their effect on over-all requirements for maintenance will be more than offset by demands accruing through water-flood operations.

The expenditures for maintenance during 1950 are estimated to gross more than $40,750,000. Texas, with 79,577 wells to be maintained, budgets $10,065,000 for such expenses. California, maintaining 22,836 wells, will expend $8,563,000 during the coming year. Other states in the million-plus class are Oklahoma, 54,134 wells and $5,413,000; Pennsylvania, with $3,151,000 to maintain 84,036 wells; Kansas, earmarking $2,989,000 to care for 29,886 wells; Illinois, $2,703,000 and 31,798; Kentucky, $1,283,000 and 15,091 wells; and Ohio, expending $1,090,000 to keep up 21,902 wells. Four of the Texas Railroad Districts, 6, 7-B, 8 and 9, will each expend more than $1 million in maintaining the wells within its borders. Maintenance figures do not include labor, nor transport or power involved in any well maintenance.

With the possible exception of marginal stripper well production, oil lost through down days incurred through the use of makeshift equipment is considered to override the possible savings gained in equipment expenditures. Thus, the column headed "Estimated Number Wells to Go On Pump" may be considered to represent equipment demand which will be filled from one of three sources: purchase of new equipment; regrading of equipment at present situated on some other producing property of the same company—in which case there should occur a market for a replacement at one or the other of the wells; or by reconditioning of equipment which has been released after serving on a well which has been abandoned or converted from producer to water- or gas-input well. What portion of these requirements can be filled from company warehouse stocks is indeterminate, and could be ascertained only by a complete canvass of all equipment on hand. As far as reconditioning salvaged equipment is concerned, there is more likely to be a stock of repair parts available if the type of equipment being transferred is being replaced on later leases by other and perhaps more modern units. There will be, however, a considerable expenditure in any program of reconversion.

Equipment Transfers

There is evidence in some areas of Texas that companies which in the early '30's equipped their leases in the East Texas field for pumping are still transferring these units to areas where pumping equipment is immediately required. This transfer, noted first during the war years, has been reduced in volume, and most of the estimated 8000 pumping units now idle in the East Texas field may be expected to remain in place—usually without motors or other prime-movers—and thus will not constitute a "bank" of equipment on which the companies will draw for units in rare cases of emergency. Still, there is some tendency to borrow parts from such idle equipment for temporary repair of damaged units of the same type on a company's leases farther to the west of the big field where pumping may be required and where the volume of salt water handled imposes overloads.

A survey of equipment manufacture indicates that there will be readily available during 1950 a choice of equipment within the capacity and power ranges demanded by any production conditions which may be anticipated for the coming year.

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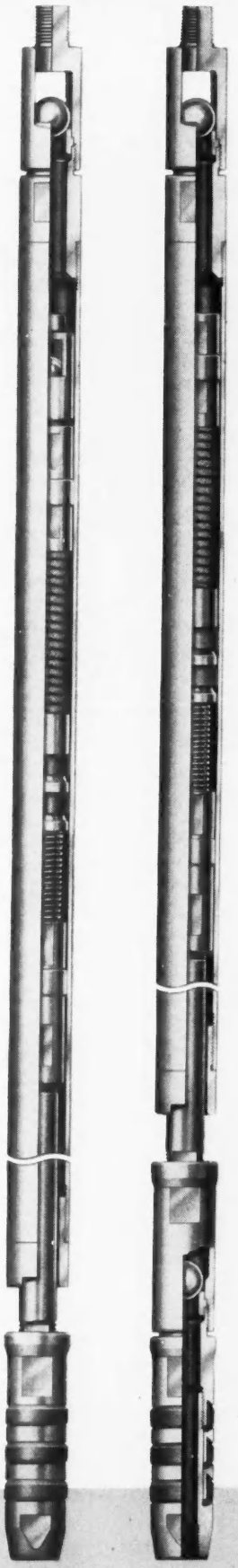

Fig. 1
Traveling Barrel Assembly with 2 Cup and Packing Plunger With Gas Valve.

Fig. 2
Traveling Barrel Assembly with 2 Cup and Packing Plunger Without Gas Valve

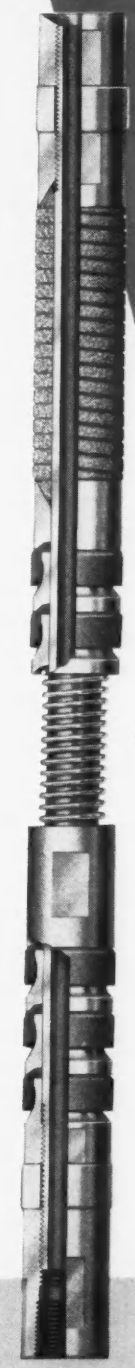

Fig. 3
5 Cup and Packing Plunger Without Gas Valve

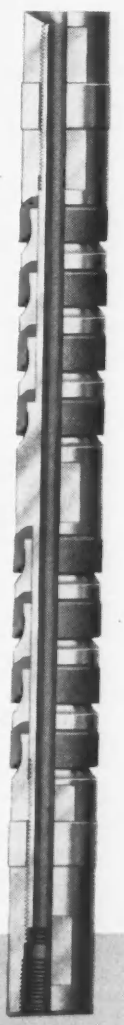

Fig. 4
8 Cup Plunger Without Gas Valve

Fig. 5
4 Cup Plunger Without Gas Valve

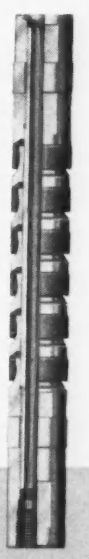

Fig. 6
6 Cup Plunger Without Gas Valve

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U.S. CRUDE PRODUCTION

To Climb After 1949 Slump

UNITED States producers entered 1950 with an oversupply of crude; with battle lines drawn over the imports problem; and with a dread of a reduction of the depletion allowance—but nevertheless with strong prospects of producing the second greatest amount of crude in its history.

Indications are the U. S. industry will bring up crude at a daily average rate of 5,129,000 barrels, which would best the 1949 yield of 5,040,000 barrels while lagging behind 1948's record performance of 5,509,000 barrels daily.

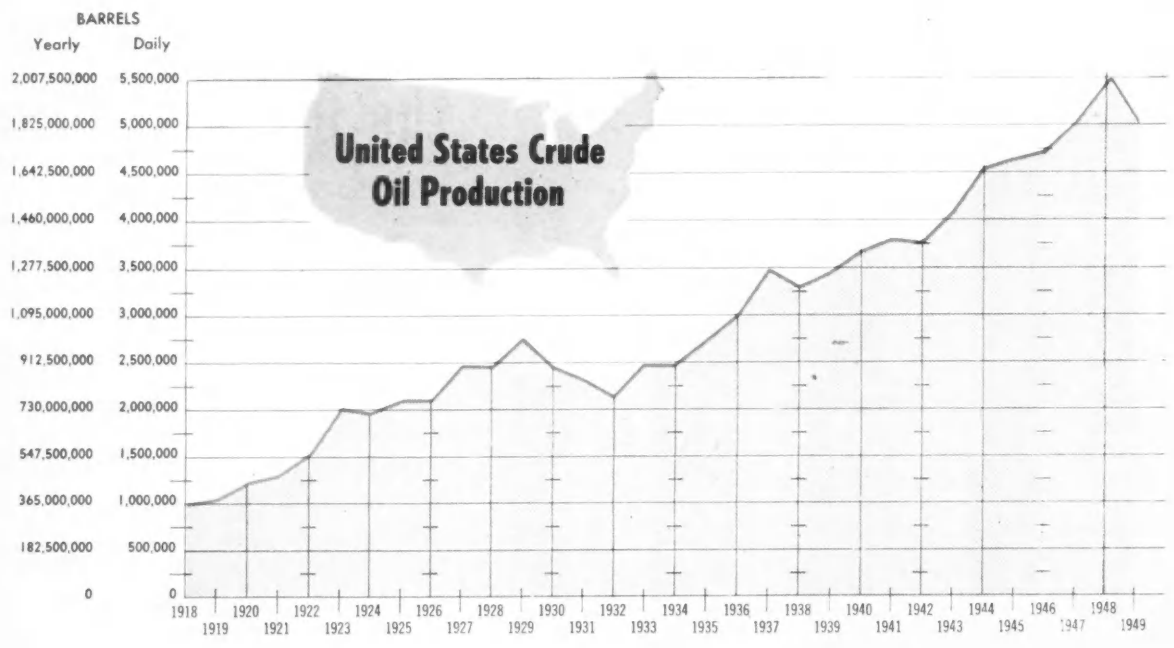
It is estimated that total U. S. production for the year ahead will be 1,872,000,000 barrels, which would be 32,385,000 more than was produced in 1949 but 144,282,000 less than was brought up in 1948, when U. S. crude output went over the 2 billion mark for the first time.

High Yield Expected

The indicated daily average production of 5,129,000 for 1950 would exceed the average daily yield for eight of the 12 months in 1949 and would top every month in the latter part of last year except November, when production reached 5,174,000 barrels daily after a steady climb that began in July.

The predicted gain of 1.7 percent over the 1949 daily average reflects: (1) the likelihood of a normal growth in demand following the 1949 drop from 1948's titanic effort to satisfy pent-up demand; (2) the belief that imports will be curbed; and (3) hope that the depletion allowance will not be reduced in 1950.

That a larger gain is not predicted is due partly to continued relatively large



(All Figures in Barrels)

YEAR	Yearly Total	Daily Average	YEAR	Yearly Total	Daily Average	YEAR	Yearly Total	Daily Average
1918	355,928,000	975,000	1929	1,007,323,000	2,760,000	1940	1,353,214,000	3,707,000
1919	378,367,000	1,037,000	1930	898,011,000	2,460,000	1941	1,402,228,000	3,842,000
1920	442,929,000	1,213,000	1931	851,081,000	2,332,000	1942	1,386,645,000	3,799,000
1921	472,183,000	1,294,000	1932	785,159,000	2,151,000	1943	1,505,613,000	4,124,900
1922	557,531,000	1,528,000	1933	905,656,000	2,481,000	1944	1,677,904,000	4,584,400
1923	732,407,000	2,007,000	1934	908,065,000	2,488,000	1945	1,713,655,000	4,694,900
1924	713,940,000	1,956,000	1935	996,596,000	2,730,000	1946	1,733,939,000	4,750,500
1925	763,743,000	2,092,000	1936	1,099,687,000	3,013,000	1947	1,856,987,000	5,087,600
1926	770,874,000	2,112,000	1937	1,279,160,000	3,505,000	1948	2,016,282,000	5,509,000
1927	901,129,000	2,469,000	1938	1,214,355,000	3,327,000	1949	1,839,615,000	5,040,000
1928	901,474,000	2,469,000	1939	1,264,962,000	3,466,000	1950 Est.	1,872,000,000	5,128,800

Source: U. S. Bureau of Mines, except 1949, which has been calculated with aid of Bureau statistics for first 10 months and American Petroleum Institute weekly reports for last two months.

imports and partly to the necessity of avoiding additions to crude stocks, which not once in 1949 fell below 250 million barrels, though at year's end they were 1,085,000 barrels below the same month for 1948.

The 8.5 percent production slash in 1949 stung worse in Texas, the nation's leader, where output plunged 17.3 percent from 1948. Of the other states in the Big 5 of U. S. oil production, California cut back 1.9 percent, Oklahoma 1.6 percent, and Kansas 7.8 percent. Louisiana alone hiked its yield by 5.7 percent over 1948.

The combined daily average of these five states totaled 4,168,500 barrels daily in 1949, down 444,200 from 1948's record 4,612,700 barrels daily, thus accounting for 94.3 percent of the 469,000-barrel daily drop suffered by the U. S. industry.

These same five states are likely to be the chief contributors of whatever increase occurs in 1950, and this despite the fact they will continue to experience drastic proration of per well yields.

Among the individual states, Texas was far in the lead with 40.48 percent of total U. S. production, down 4.32 percent from its 1948 yield of 44.8 percent of the nation's output. The state produced an average of 2,040,500 barrels daily (744,766,000 for the year) during 1949, thus contributing 427,600 barrels daily (158,552,000 for the year) less than in 1948. This contrasts with a daily average gain of 222,900 barrels for 1948 over the 1947 performance. Texas' 1949 production decline of 158,552,000 barrels accounted for all but 18,115,000 barrels or 89.7 percent of the total U. S. drop of 176,557,000 for the year.

Eight of Texas' 11 oil-producing regions shared in the loss, and the six heaviest producing districts were among these eight. Hardest hit percentage-wise was District 2 (Middle Gulf), where production declined 25.9 percent, but heaviest losers in total barrels were District 8 (West Texas), where output nosedived from 255,412,000 to 210,669,000 barrels for the year, and District 3 (Upper Gulf Coast), where production dropped from 183,374,000 to 145,208,000 barrels.

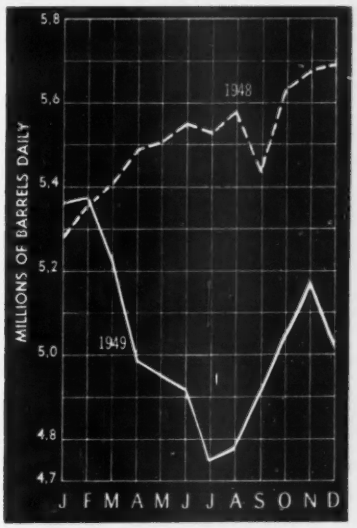
District Gains

Of the three Texas districts registering gains, only one surpassed its 1948 mark by 5 percent or more. This was District 7-B (North Central), which had a gain of 21.4 percent accounted for by a 29.4 percent rise in completions for the year. This district's 1949 daily average production was 60,700 barrels daily compared with 50,000 in 1948. Other Texas districts to make gains were District 10 (Panhandle) 4.6 percent, and District 7-C (West Central), 3.7 percent.

Texas' 1949 production raised its cumulative yield to nearly 13 billion barrels, or 33.11 percent of the almost 39 billion barrels produced in the U. S. since 1859.

Only two other states have a cumulative yield of more than 10 percent of the nation's all-time production. They are California, with 21.29 percent, and Oklahoma, 15.66 percent. Of the other members of the current Big 5, Louisiana has contributed 6.04 percent and Kansas 5.12 percent of the all-time total.

The year's production left seven states in the select group of those which have produced 1 billion or more barrels of oil. California has contributed 8,291,813,000, Oklahoma 6,095,921,000, Louisiana 2,351,890,000, Kansas 1,991,888,000, Illinois

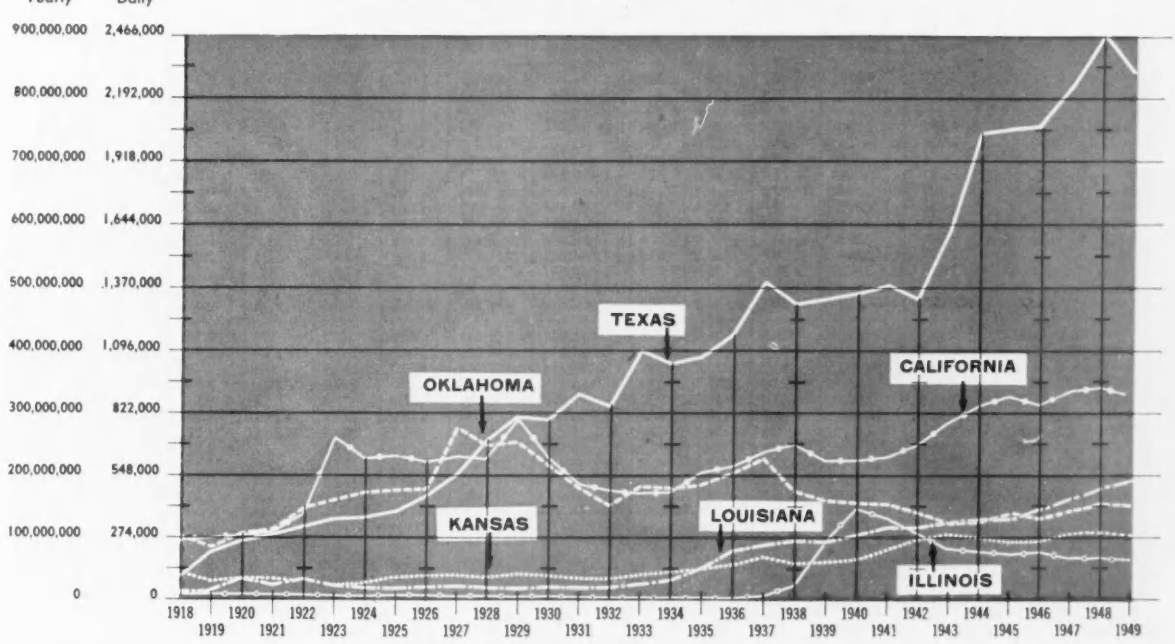


Daily Average Crude Oil Production By Months

MONTH	1949	1948
January	5,389,000	5,283,300
February	5,375,600	5,352,500
March	5,224,300	5,406,200
April	5,011,800	5,483,600
May	4,972,400	5,502,400
June	4,903,300	5,544,400
July	4,703,800	5,522,500
August	4,780,400	5,577,000
September	4,940,200	5,434,600
October	5,029,300	5,631,600
November	5,174,000	5,674,700
December	5,004,000	5,688,000

Source: U. S. Bureau of Mines, except for last two months of 1949.

Principal Producing Areas Of United States



1,444,300,000, and Pennsylvania 1,113,167,000. Louisiana, fourth in line in the cumulative standings, is the youngest producer of the group, having tapped its first production in 1902, whereas the oil history of the other leaders began in the previous century.

California easily retained its position as the second ranking state. Output totaled 332,749,000 barrels, compared with its 1948 yield of 340,089,000 barrels.

Louisiana, third-ranking state, registered a 3.2 percent gain in the northern sector and a 6.5 percent increase in the southern area to boost its daily average output to 523,100 barrels and its 1949 yield to 190,942,000.

Oklahoma followed with a daily average production of 414,100 barrels and an annual yield of 151,139,000. Then came Kansas with a daily average of 279,200.

Among the larger producing states to show a production gain for the year was Illinois, which increased its daily average yield from 176,700 to 177,100 for a percentage jump of .2 percent.

Only eight states besides Louisiana and Illinois registered an increase in production for the year. Percentage-wise, the leader was Florida, which upped its yield 50 percent. In barrels, the next best gain was made by Colorado, which boosted its output from an average of 46,000 barrels daily in 1948 to 65,800 barrels daily in 1949.

Mississippi was among the suffering states in the bracket of those with substantial production. Its daily average slumped 16.9 percent from 125,200 to 104,100 barrels. Another state registering a sharp decline was Wyoming, which had a daily average of 147,600 barrels in 1948 and 128,000 barrels in 1949 for a percentage loss of 13.3 percent.

The year just past had the dubious distinction of breaking a steady rise in production that began in 1942. That year the U. S. industry brought up 1,386,645,000 barrels, and thereafter until 1949 averaged a gain of more than 1 million barrels per year.

The U. S. has now produced 1 billion or more barrels each year since 1935. One other year, in lush 1929, its production also went over the billion mark.

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U. S. Crude Oil Production, by States and Districts, December and Years, 1948 and 1949

From U. S. Bureau of Mines, except November and December, 1949, estimated from A.P.I. weekly reports, and breakdown of Louisiana and Texas by districts based on various sources.

(THOUSANDS OF BARRELS)

STATE or DISTRICT	PRODUCTION IN DECEMBER: Monthly Total in December 1948	1949	% Diff. '48-'49	Daily Average for December 1948	1949	PRODUCTION DURING YEAR: Year Total 1948	1949	Daily Average for Year 1948	1949	% Diff. '48-'49	Year's Prod. in 1949 as Percent of U.S. Total	CUMULATIVE PRODUCTION To End of 1949: Thousands of Barrels	As Percent of U.S. Cum.
Alabama	38	46	+ 21.1	1.2	1.5	466	456	1.3	1.2	— 7.7	0.02	1,922	....
Arkansas	2,687	2,440	— 9.2	86.7	78.7	31,675	29,521	86.5	80.9	— 6.5	1.60	764,522	1.96
California	29,437	26,932	— 8.5	949.6	868.8	340,089	332,749	929.2	911.6	— 1.9	18.09	8,291,813	21.29
Colorado	1,325	1,922	+ 45.1	42.7	62.0	16,827	24,014	46.0	65.8	+43.0	1.31	123,083	0.32
Florida	28	28	.....	0.8	0.9	290	440	0.8	1.2	+50.0	0.02	1,092	....
Illinois	5,508	5,542	+ 0.6	177.7	178.8	64,669	64,652	176.7	177.1	+ 0.2	3.51	1,444,300	3.71
Indiana	699	873	+ 24.9	22.5	28.2	6,710	9,501	18.3	26.0	+42.1	0.52	189,565	0.49
Kansas	9,747	8,812	— 9.6	314.5	284.2	110,833	101,894	302.8	279.2	— 7.8	5.54	1,991,888	5.12
Kentucky	722	786	+ 8.9	23.3	25.3	8,551	8,621	23.4	23.6	+ 0.9	0.47	241,433	0.62
Louisiana*	16,143	17,315	+ 7.3	520.8	558.5	181,181	190,942	495.0	523.1	+ 5.7	10.38	2,351,890	6.04
North Louisiana	3,877	4,019	+ 3.7	125.1	129.6	43,468	44,727	118.7	122.5	+ 3.2	2.43	792,216	2.03
South Louisiana	12,266	13,296	+ 8.4	395.7	428.9	137,713	146,215	376.3	400.6	+ 6.5	7.95	1,423,702	3.66
Michigan	1,504	1,380	— 8.2	48.5	44.5	16,870	16,378	346.1	44.9	— 2.6	0.89	306,281	0.79
Mississippi	3,956	3,126	— 21.0	127.6	100.8	45,809	37,999	125.2	104.1	—16.9	2.07	245,904	0.63
Missouri	5	4	— 20.0	0.2	0.1	53	48	0.1	0.1	.....	.....	554	....
Montana	799	711	— 11.0	25.8	22.9	9,380	9,154	25.6	25.1	— 2.0	0.50	160,176	0 41
Nebraska	24	44	+ 83.3	0.8	1.4	240	318	0.6	0.9	+50.0	0.02	5,850	0.02
New Mexico	4,232	4,040	— 4.5	136.5	130.3	47,969	47,893	131.1	131.2	+ 0.1	2.60	635,276	1.63
New York	386	418	+ 8.3	12.4	13.4	4,621	4,385	12.6	12.0	— 4.8	0.24	172,828	0.44
Ohio	281	283	+ 0.7	9.1	9.1	3,300	3,426	9.0	9.4	+ 4.4	0.19	617,259	1.59
Oklahoma	13,957	12,699	— 9.0	450.2	409.6	154,032	151,139	420.9	414.1	— 1.6	8.22	6,095,921	15.66
Pennsylvania	1,020	856	— 16.1	32.9	27.6	12,667	11,237	34.6	30.8	—11.0	0.61	1,113,167	2.86
Tennessee	1	4	+300.0	.....	0.1	8	22	.....	0.1	.....	.....	498	....
Texas*	79,138	62,460	— 21.1	2,552.8	2,014.8	903,318	744,766	2,468.2	2,040.4	—17.3	40.48	12,892,737	33.11
Dist. 1—South Central	867	810	— 6.6	28 0	26 1	10,036	9,693	27.4	26.6	— 2.9	0.53	277,018	0.71
Dist. 2—Middle Gulf	5,615	3,704	— 34.0	181.1	119.5	64,349	47,559	175.8	130.3	—25.9	2.59	505,880	1.30
Dist. 3—Upper Gulf	16,012	12,000	— 25.1	516.5	387.1	183,374	145,208	501.0	397.8	—20.6	7.89	2,468,447	6.34
Dist. 4—L. Gulf-S.W.	7,833	5,876	— 25.0	252.7	189.5	92,958	71,987	254.0	197.2	—22.4	3.91	848,396	2.18
Dist. 5—E. Central	1,608	1,062	— 33.9	51.9	34.3	17,496	13,561	47.8	37.2	—22.2	0.74	497,248	1.28
Dist. 6—Northeast	12,978	10,113	— 22.1	418.6	326.2	157,034	127,680	429.1	349.8	—18.5	6.94	2,314.609	5.94
Dist. 7-B—N. Central	1,926	1,908	— 0.9	62.1	61.5	18,299	22,152	50.0	60.7	+21.4	1.20	460,810	1.18
Dist. 7-C—W. Central	1,560	1,591	+ 2.0	50.3	51.3	16,622	17,175	45.4	47.1	+ 3.7	0.93	230,876	0.59
Dist. 8—West	22,991	18,171	— 21.0	741.7	586.2	255,412	210,669	697.8	577.2	—17.3	11.45	2,146,259	5.51
Dist. 9—North	4,475	4,362	— 2.5	144.3	140.7	51,326	49,392	140.2	135.3	— 3.5	2.68	1,051,424	2.70
Dist. 10—Panhandle	2,762	2,864	+ 3.7	89.1	92.4	31,869	33,255	87.1	91.1	+ 4.6	1.81	637,020	1.64
Utah	.....	90	.....	.....	2.9	.....	464	.....	1.3	.....	0.03	475	...
Virginia	3	3	.....	0.1	0.1	33	42	0.1	0.1	.....	.....	169	....
West Virginia	220	240	+ 9.1	7.1	7.8	2,687	2,830	7.3	7.8	+ 6.8	0.15	438,138	1.12
Wyoming	4,469	4,067	— 9.0	144.2	131.2	54,004	46,724	147.6	128.0	—13.3	2.54	851,973	2.19
Unclassified	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	572	....
Total United States	176,329	155,121	— 12.0	5,688.0	5,003.5	2,016,282	1,839,615	5,509.0	5,040.0	— 8.5	100.00	38,939,286	100.00

* Data on Louisiana and Texas by districts are from various sources and do not agree with state totals, which are on Bureau of Mines basis.

United States Crude Oil Production, By States, By Years (Part 1)

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

Year	Alabama	Arkansas	California	Colorado	Florida	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Missouri	Montana	Nebraska	New Mexico
1859	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1861	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1862	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1863	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1864	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	....	.....	.....
1865	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	....	.....	.....
1866	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	...	.....	.....
1867	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1868	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1869	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1870	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1871	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1872	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1873	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1874	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1876	.....	.....	12	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1877	.....	.....	13	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1878	.....	.....	15	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1879	.....	.....	20	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1880	.....	.....	40	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	100	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1882	.....	.....	129	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1883	.....	.....	143	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1884	.....	.....	262	.....	.....	.....	.....	.....	G4	.....	.....	.....	.....	.....	.....	.....
1885	.....	.....	325	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	377	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1887	.....	.....	678	76	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1888	.....	.....	690	298	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1889	.....	.....	303	317	.....	1	33	1	G5	.....	.....	.....	H	.....	.....	.....
1890	.....	.....	307	369	.....	1	64	1	G6	.....	.....	.....	H	.....	.....	.....
1891	.....	.....	324	666	.....	1	137	1	G9	.....	.....	.....	H	.....	.....	.....
1892	.....	.....	385	824	.....	1	698	5	G7	.....	.....	.....	H	.....	.....	.....
1893	.....	.....	470	594	.....	1	2,335	18	G3	.....	.....	.....	H	.....	.....	.....
1894	.....	.....	706	516	.....	H	3,689	40	G2	.....	.....	.....	H	.....	.....	.....
1895	.....	.....	1,209	438	.....	H	4,386	44	G2	.....	.....	.....	H	.....	.....	.....
1896	.....	.....	1,253	361	.....	H	4,681	114	G2	.....	.....	.....	H	.....	.....	.....
1897	.....	.....	1,903	385	.....	1	4,122	81	G H	.....	.....	.....	H	.....	.....	.....
1898	.....	.....	2,257	444	.....	H	3,731	72	G6	.....	.....	.....	H	.....	.....	.....
1899	.....	.....	2,642	390	.....	H	3,848	70	G18	.....	.....	.....	H	.....	.....	.....
1900	.....	.....	4,325	317	.....	H	4,874	75	G62	.....	J	.....	J2	.....	.....	.....
1901	.....	.....	8,787	461	.....	H	5,757	179	G137	.....	J	.....	J2	.....	.....	.....
1902	.....	.....	13,984	397	.....	H	7,481	332	G185	549	J	.....	J1	.....	.....	.....
1903	.....	.....	24,382	484	.....	.....	9,186	932	G554	918	J	.....	J3	.....	.....	.....
1904	.....	.....	29,649	501	.....	.....	11,339	4,251	G998	2,959	J	.....	J3	.....	.....	.....
1905	.....	.....	33,428	376	.....	181	10,964	I3,750	G1,217	8,910	J	.....	J3	.....	.....	.....
1906	.....	.....	33,099	328	.....	4,397	7,674	I3,627	G1,214	9,077	J	.....	J3	.....	.....	.....
1907	.....	.....	39,748	332	.....	24,282	5,128	2,410	G821	5,000	J	.....	J4	.....	.....	.....
1908	.....	.....	44,855	380	.....	33,686	3,283	1,801	728	5,789	J	.....	J15	.....	.....	.....
1909	.....	.....	55,472	311	.....	30,898	2,296	1,264	639	3,060	J	.....	J6	.....	.....	.....
1910	.....	.....	73,011	240	.....	33,143	2,160	1,128	469	6,841	J	.....	J4	.....	.....	.....
1911	.....	.....	81,134	227	.....	31,317	1,695	1,279	472	10,721	J	.....	J8	.....	.....	.....
1912	.....	.....	87,269	206	.....	28,602	970	1,593	484	9,263	K	.....	.....	.....	.....	.....
1913	.....	.....	97,788	189	.....	23,894	956	2,375	525	12,499	K	.....	K	.....	.....	K
1914	.....	.....	99,775	223	.....	21,920	1,336	3,104	503	14,309	K	.....	K	.....	.....	.....
1915	.....	.....	86,592	208	.....	19,042	876	2,823	437	18,192	K	.....	K	.....	.....	.....
1916	.....	.....	90,952	197	.....	17,714	769	8,738	L1,202	15,248	K	.....	K	45	.....	.....
1917	.....	.....	93,878	121	.....	15,777	760	36,536	L3,088	11,392	K	.....	.....	100	.....	.....
1918	.....	.....	97,532	143	.....	13,366	878	45,451	L4,368	16,043	K	.....	.....	69	.....	.....
1919	.....	.....	101,183	121	.....	11,960	972	33,048	9,278	17,188	K	.....	K	90	.....	K
1920	.....	K	103,377	111	.....	10,774	945	39,005	8,738	35,714	.....	.....	K	340	.....	K
1921	.....	10,473	112,600	108	.....	10,043	1,158	36,456	9,013	27,103	.....	.....	K	1,509	.....	K
1922	.....	12,712	138,468	97	.....	9,383	1,087	31,766	8,973	35,376	.....	.....	K	2,449	.....	K
1923	.....	36,610	262,876	86	.....	8,707	1,043	28,250	8,069	24,919	.....	.....	K	2,782	.....	K
1924	.....	46,028	228,933	445	.....	8,081	935	28,836	7,407	21,124	.....	.....	.....	2,815	.....	98
1925	.....	77,398	232,492	1,226	.....	7,863	829	38,357	6,759	20,272	4	.....	.....	4,091	.....	1,060
1926	.....	58,332	224,673	2,768	.....	7,760	808	41,498	6,274	23,201	94	.....	.....	7,727	.....	1,666
1927	.....	40,005	231,196	2,831	.....	6,994	852	41,069	6,719	22,818	439	.....	.....	5,058	.....	1,226
1928	.....	32,096	231,811	2,774	.....	6,462	1,052	38,596	7,359	21,847	594	.....	.....	4,015	.....	943
1929	.....	24,917	292,534	2,358	.....	6,319	981	42,813	7,775	20,554	4,528	.....	.....	3,980	.....	1,830
1930	.....	19,702	227,329	1,656	.....	5,736	994	41,638	7,389	23,272	3,911	.....	.....	3,349	.....	10,189
1931	.....	14,791	188,830	1,545	.....	5,039	840	37,018	6,456	21,804	3,789	.....	.....	2,830	.....	15,227
1932	.....	12,051	178,128	1,136	.....	4,673	806	34,848	6,287	21,807	6,910	.....	K	2,457	.....	12,455
1933	.....	11,686	172,010	919	.....	4,244	737	41,976	4,608	25 168	7,942	K	K	2,273	.....	14,116
1934	.....	11,182	174,305	1,139	.....	4,479	838	46,482	4,860	32,869	10,603	K	K	3,603	.....	16,864
1935	.....	11,008	207,832	1,560	.....	4,322	777	54.843	5,258	50.330	15,776	K	K	4,603	.....	20,483
1936	.....	10,469	214,773	1,650	.....	4,475	822	58,317	5,633	80,491	11,928	.....	K	5,868	.....	27,223
1937	.....	11,764	238,521	1,605	.....	7,499	844	70,761	5.484	90.924	16,628	.....	K	5,805	.....	38,854
1938	.....	18,180	249,749	1,412	.....	24,075	995	60,064	5,821	95,208	18,745	.....	K	4,946	.....	35,759
1939	.....	21,238	224,354	1,404	.....	94,912	1,711	60.703	5,621	93,646	23,462	107	40	5,960	2	37,637
1940	.....	25,775	223,881	1,626	.....	147,647	4,978	66,139	5,188	103,584	19,753	4,400	44	6,728	276	39,129
1941	.....	26,327	230,263	2,150	.....	132,393	7,411	83,242	4,762	115,908	16,359	15,327	47	7,526	1,898	39,569
1942	.....	26,628	248,326	2,199	.....	106,391	6,743	97,636	4,534	115,785	21,754	28,833	36	8,074	1,237	31,544
1943	.....	27,600	284,188	2,320	4	82,260	5,283	106,178	7,883	123,592	20,768	18,807	36	7,916	635	38,896
1944	43	29,418	311,793	3,083	12	77,413	5,118	98,762	9,621	129,645	18,490	16,337	45	8,647	417	39,555
1945	181	28,613	326,482	5,036	30	75,094	4,868	96,415	10,325	131,051	17,267	19,062	45	8,420	305	37,351
1946	380	28,375	314,713	11,856	57	75,297	6,726	97,218	10,578	143,669	17,074	24,298	51	8,825	293	36,814
1947	396	29,948	333,132	15,702	259	66,459	6,095	105,132	9,397	160,128	16,215	34,925	55	8,742	229	40,926
1948	466	31,675	340,089	16,827	290	64,669	6,710	110,833	8,551	181,181	16,870	45,809	53	9,380	240	47,969
1949P	456	29,521	332,749	24,014	440	64,652	9,501	101,894	8,621	190,942	16,378	37,999	48	9,154	318	47,893
Total.	1,922	764,522	8,291,813	123,083	1,092	1,444,300	189,565	1,991,888	241,433	2,351,890	306,281	245,904	554	160,176	5,850	635,276

A Utah production estimated at 3,650 barrels in 1939; 3,126 barrels in 1940; and 189,726 barrels cumulative through 1940.

B *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, shows for Alaska the following data: 1904-1919, estimated, 56,000 barrels; 1920, 11,000 barrels; 1921, 10,000 barrels; 1922-1928, estimated, 73,000 barrels; total, 1904-1928, 150,000 barrels.

C "Unclassified" includes 1912, Alaska and Michigan; 1913, Alaska, Michigan, Missouri and New Mexico; 1914-16, Alaska, Michigan and Missouri; 1917-18, Alaska and Michigan; 1919, Alaska, Michigan, Missouri and New Mexico; 1920. Alaska, Arkansas, Missouri, New Mexico and Utah; 1921-23, Alaska, Missouri and New Mexico; 1924-31, Alaska and Utah; 1932, Alaska, Missouri and Utah; 1933, Alaska, Mississippi, Missouri and Utah; 1934, Mississippi, Missouri and Utah; 1935, Mississippi, Missouri, Tennessee and Utah; 1936-1938; Missouri, Tennessee and Utah.

D Pennsylvania and New York separated in years 1864-1881, by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

E *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, gives the following additional estimates which are not shown by the official *Mineral Resources*; Ohio, 1860-1875, 200,000 barrels; West Virginia, 1860-1875, 2,800,000 barrels; Kentucky, 1860-1882, 161,000 barrels.

United States Crude Oil Production, By States, By Years (Part 2)

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

Year	New York	Ohio	Oklahoma	Pennsylvania	Tennessee	Texas	[A] Utah	Virginia	West Virginia	Wyoming	[B] Alaska	[C] Unclassified	Total United States	Total Value At Wells (Thousands of Dollars)	[O] Average Value per Bbl.
1859	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2	$ 32	$20.00
1860	.....	[E]	.....	500	.....	.....	.....	.....	[E]	.....	.....	.....	500	4,800	9.60
1861	.....	[E]	.....	2,114	.....	.....	.....	.....	[E]	.....	.....	.....	2,114	1,036	.52
1862	.....	[E]	.....	3,057	.....	.....	.....	.....	[E]	.....	.....	.....	3,057	3,210	1.05
1863	.....	[E]	.....	2,611	.....	.....	.....	.....	[E]	.....	.....	.....	2,611	8,226	3.15
1864	[D F H]	[E]	.....	[D F] 2,116	.....	.....	.....	.....	[E]	.....	.....	.....	2,116	20,897	8.15
1865	[D] 100	[E]	.....	[D] 2,398	.....	.....	.....	.....	[E]	.....	.....	.....	2,498	16,460	6.59
1866	[D] 144	[E]	.....	[D] 3,454	.....	.....	.....	.....	[E]	.....	.....	.....	3,598	13,455	3.75
1867	[D] 134	[E]	.....	[D] 3,213	.....	.....	.....	.....	[E]	.....	.....	.....	3,347	8,067	2.40
1868	[D] 146	[E]	.....	[D] 3,500	.....	.....	.....	.....	[E]	.....	.....	.....	3,646	13,217	3.62
1869	[D] 169	[E]	.....	[D] 4,046	.....	.....	.....	.....	[E]	.....	.....	.....	4,215	23,730	5.60
1870	[D] 211	[E]	.....	[D] 5,050	.....	.....	.....	.....	[E]	.....	.....	.....	5,261	20,504	3.90
1871	[D] 208	[E]	.....	[D] 4,997	.....	.....	.....	.....	[E]	.....	.....	.....	5,205	22,591	4.40
1872	[D] 252	[E]	.....	[D] 6,041	.....	.....	.....	.....	[E]	.....	.....	.....	6,293	21,440	3.75
1873	[D] 396	[E]	.....	[D] 9,498	.....	.....	.....	.....	[E]	.....	.....	.....	9,894	18,100	1.80
1874	[D] 437	[E]	.....	[D] 10,490	.....	.....	.....	.....	[E]	.....	.....	.....	10,927	12,648	1.15
1875	[D] 352	[E]	.....	[D] 8,436	.....	.....	.....	.....	[E]	.....	.....	.....	8,788	7,368	.97
1876	[D] 359	32	.....	[D] 8,610	[G]	.....	.....	.....	120	.....	.....	.....	9,133	22,983	2.52
1877	[D] 525	30	.....	[D] 12,610	[G]	.....	.....	.....	172	.....	.....	.....	13,350	31,789	2.38
1878	[D] 607	38	.....	[D] 14,557	[G]	.....	.....	.....	180	.....	.....	.....	15,397	18,045	1.17
1879	[D] 787	29	.....	[D] 18,898	[G]	.....	.....	.....	180	.....	.....	.....	19,914	17,211	.86
1880	[D] 1,041	39	.....	[D] 24,987	[G]	.....	.....	.....	179	.....	.....	.....	26,286	24,601	.94
1881	[D] 1,095	34	.....	[D] 26,281	[G]	.....	.....	.....	151	.....	.....	.....	27,661	25,448	.92
1882	6,685	40	.....	23,368	[G]	.....	.....	.....	128	.....	.....	.....	30,350	23,631	.78
1883	4,004	47	.....	19,125	[G]	.....	.....	.....	126	.....	.....	.....	23,450	25,790	1.10
1884	3,231	90	.....	20,541	[G]	.....	.....	.....	90	.....	.....	.....	24,218	20,596	.85
1885	2,658	662	.....	18,118	[G]	.....	.....	.....	91	.....	.....	.....	21,859	19,198	.88
1886	2,151	1,783	.....	23,647	[G]	.....	.....	.....	102	.....	.....	.....	28,065	19,996	.71
1887	2,075	5,023	.....	20,281	[G]	.....	.....	.....	145	.....	.....	.....	28,283	18,877	.67
1888	1,789	10,011	.....	14,700	[G]	.....	.....	.....	119	.....	.....	.....	27,612	17,948	.65
1889	1,897	12,472	.....	19,591	[G]	[H]	.....	.....	544	.....	.....	.....	35,164	26,963	.77
1890	1,658	16,125	.....	26,800	[G]	.....	.....	.....	493	.....	.....	.....	45,824	35,365	.77
1891	1,585	17,740	[H]	31,424	[G]	[H]	.....	.....	2,406	.....	.....	.....	54,293	30,527	.56
1892	1,273	16,363	[H]	27,149	[G]	[H]	.....	.....	3,810	.....	.....	.....	50,515	25,907	.51
1893	1,032	16,249	[H]	19,283	[G]	[H]	.....	.....	8,446	.....	.....	.....	48,431	28,950	.60
1894	942	16,792	[H]	18,078	[G]	[H]	.....	.....	8,577	2	.....	.....	49,344	35,522	.72
1895	913	19,545	[H]	18,231	[G]	[H]	.....	.....	8,120	4	.....	.....	52,892	57,632	1.09
1896	1,205	23,941	[H]	19,379	[G]	1	.....	.....	10,020	3	.....	.....	60,960	58,519	.96
1897	1,279	21,561	1	17,983	[G]	66	.....	.....	13,090	4	.....	.....	60,476	40,874	.68
1898	1,205	18,739	.....	14,743	[G]	546	.....	.....	13,615	6	.....	.....	55,364	44,193	.80
1899	1,321	21,142	.....	13,054	[G]	669	.....	.....	13,911	6	.....	.....	57,071	64,604	1.13
1900	1,301	22,363	6	13,258	[G]	836	.....	.....	16,196	6	.....	.....	63,621	75,989	1.19
1901	1,207	21,648	10	12,625	[G]	4,394	.....	.....	14,177	5	.....	.....	69,389	66,417	.96
1902	1,120	21,014	37	12,064	[G]	18,084	.....	.....	13,513	6	.....	.....	88,767	71,179	.80
1903	1,163	20,480	139	11,355	[G]	17,956	.....	.....	12,900	9	.....	.....	100,461	94,694	.94
1904	1,113	18,877	1,367	11,126	[G]	22,241	.....	.....	12,645	12	[N]	.....	117,081	101,175	.86
1905	1,118	16,347	[I] 8,264	10,437	[G]	28,136	.....	.....	11,578	8	.....	.....	134,717	84,157	.62
1906	1,243	14,788	[I] 18,091	10,257	[G]	12,568	.....	.....	10,121	7	.....	.....	126,494	92,445	.73
1907	1,212	12,207	43,524	10,000	[G]	12,323	[M]	.....	9,095	[M] 9	[N]	.....	166,095	120,107	.72
1908	1,160	10,859	45,799	9,424	.....	11,207	[M]	.....	9,523	[M] 18	.....	.....	178,527	129,079	.72
1909	1,135	10,633	47,859	9,299	.....	9,534	[M]	.....	10,745	[M] 20	.....	.....	183,171	128,329	.70
1910	1,054	9,916	52,029	8,795	.....	8,899	[M]	.....	11,753	[M] 115	.....	.....	209,557	127,900	.61
1911	953	8,817	56,069	8,248	.....	9,526	[M]	.....	9,796	[M] 187	[N]	.....	220,449	134,045	.61
1912	874	8,969	51,427	7,838	.....	11,735	[M]	.....	12,129	[M] 1,572	[K]	4	222,935	164,213	.74
1913	948	8,781	63,579	7,917	.....	15,010	[N]	.....	11,567	2,407	[K]	11	248,446	237,121	.95
1914	939	8,536	73,632	8,170	.....	20,068	[N]	.....	9,680	3,560	[K]	8	265,763	214,125	.81
1915	888	7,825	97,915	7,838	.....	24,943	[N]	.....	9,265	4,246	[K]	14	281,104	179,463	.64
1916	874	7,744	107,072	7,593	[L] 1	27,645	[N]	.....	8,731	6,234	[K]	8	300,767	330,900	1.10
1917	880	7,751	107,508	7,733	[L] 12	32,413	[N]	.....	8,379	8,978	[K]	10	335,316	522,635	1.56
1918	809	7,285	103,347	7,408	[L] 8	38,750	[N]	.....	7,867	12,596	[K]	8	355,928	703,944	1.98
1919	851	7,736	86,911	8,137	15	79,366	[N]	.....	8,327	13,172	[K]	12	378,367	760,266	2.01
1920	906	7,400	106,206	7,438	14	96,868	[K]	.....	8,249	16,831	[K]	13	442,929	1,360,745	3.07
1921	988	7,335	114,634	7,418	12	106,165	.....	.....	7,822	19,333	[K]	12	472,183	814,745	1.73
1922	1,000	6,781	149,571	7,425	10	118,684	.....	.....	7,021	26,715	[K]	13	557,531	895,111	1.61
1923	1,250	7,085	160 929	7,609	8	131,023	.....	.....	6,358	44,785	[K]	18	732,407	978,430	1.34
1924	1,440	6,811	173,538	7,486	10	134,522	[K]	.....	5,920	39,498	[K]	13	713,940	1,022,683	1.43
1925	1,695	7,212	176,768	8,097	24	144,648	[K]	.....	5,763	29,173	[K]	12	763,743	1,284,960	1.68
1926	1,956	7,272	179,195	8,961	43	166,916	[K]	.....	5,946	25,776	[K]	8	770,874	1,447,760	1.88
1927	2,242	7,593	277,775	9,526	60	217,389	[K]	.....	6,023	21,307	[K]	7	901,129	1,172,830	1.30
1928	2,603	7,015	249,857	9,956	46	257,320	[K]	.....	5,661	21,461	[K]	6	901,474	1,054,880	1.17
1929	3,377	6,743	255,004	11,820	19	296,876	[K]	.....	5,574	19,314	[K]	7	1,007,323	1,280,417	1.27
1930	3,647	6,486	216,486	12,803	21	290,457	[K]	.....	5,071	17,868	[K]	7	898,011	1,070,200	1.19
1931	3,363	5,327	180,574	11,892	6	332,437	[K]	.....	4,472	14,834	[K]	7	851,081	550,630	.65
1932	3,508	4,644	153,244	12,412	5	312,478	[K]	.....	3,876	13,418	[K]	16	785,159	680,460	.87
1933	3,181	4,235	182,251	12,624	5	402,609	[K]	.....	3,815	11,227	[K]	30	905,656	608,000	.67
1934	3,804	4,234	180,107	14,478	10	381,516	[K]	.....	4,095	12,556	.....	41	908,065	904,825	1.00
1935	4,236	4,082	185,288	15,810	[K]	392,666	[K]	.....	3,902	13,755	.....	65	996,596	961,440	.96
1936	4,663	3,847	206,555	17,070	[K]	427,411	[K]	.....	3,847	14,582	.....	63	1,099,687	1,199,820	1.09
1937	5,478	3,559	228,839	19,189	[K]	510,318	[K]	.....	3,845	19,166	.....	77	1,279,160	1,513,340	1.18
1938	5,045	3,298	174,994	17,426	[K]	475,850	[K]	.....	3,684	19,022	.....	82	1,214,355	1,373,060	1.13
1939	5,098	3,156	159,913	17,382	50	483,528	4	.....	3,580	21,454	.....	.....	1,264,962	1,294,470	1.02
1940	4,999	3,159	156,164	17,353	24	493,209	3	.....	3,444	25,711	.....	.....	1,353,214	1,385,440	1.02
1941	5,185	3,510	154,702	16,750	12	505,572	4	.....	3,433	29,878	.....	.....	1,402,228	1,602,000	1.14
1942	5,421	3,543	140,690	17,779	9	483,097	.....	.....	3,574	32,812	.....	.....	1,386,645	1,643,470	1.19
1943	5,059	3,322	123,152	15,757	10	594,343	.....	2	3,349	34,253	.....	.....	1,505,613	1,809,020	1.20
1944	4,697	2,937	124,616	14,118	8	746,699	.....	4	3,070	33,356	.....	.....	1,677,904	2,032,960	1.21
1945	4,648	2,828	139,299	12,515	8	754,710	.....	4	2,879	36,219	.....	.....	1,713,655	2,094,250	1.22
1946	4,863	2,908	134,794	12,996	10	760,215	.....	23	2,929	38,977	.....	.....	1,733,939	2,442,550	1.41
1947	4,762	3,108	141,019	12,690	8	820,210	.....	61	2,617	44,772	.....	.....	1,856,987	3,577,890	1.93
1948	4,621	3,300	154,032	12,667	8	903,318	.....	33	2,687	54,004	.....	.....	2,016,282	5,196,034	2.57
1949[P]	4,385	3,426	151,139	11,237	22	744,766	464	42	2,830	46,724	.....	.....	1,839,615	4,672,622	2.54
Total	172,828	617,259	6,095,921	1,113,167	498	12,892,737	475	169	438,138	851,973	.....	572	38,939,286	53,214,175	1.37

[F] New York included with Pennsylvania.

[G] Tennessee included with Kentucky, 1876-1907, inclusive.

[H] Less than 500 barrels.

[I] Figures for Oklahoma and Kansas for years 1905-1906 shown together by *Mineral Resources*; here divided by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[J] Michigan shown with Missouri in 1900-1911.

[K] Included under "Unclassified."

[L] Kentucky and Tennessee figures in years 1916-18 obtained with aid of *Mineral Resources* and *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[M] Insignificant production of Utah (mostly used as fuel) shown with Wyoming.

[N] Little production but no record available.

[O] Figures on average price per barrel for years 1859-1875 taken from *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer; remainder from *Mineral Resources* and *Minerals Yearbook* except 1947, and 1948 estimated.

[P] Bureau of Mines figures for first 10 months; November and December estimated by WORLD OIL, with aid of weekly reports of American Petroleum Institute and other sources.

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NATURAL GAS PRODUCTION

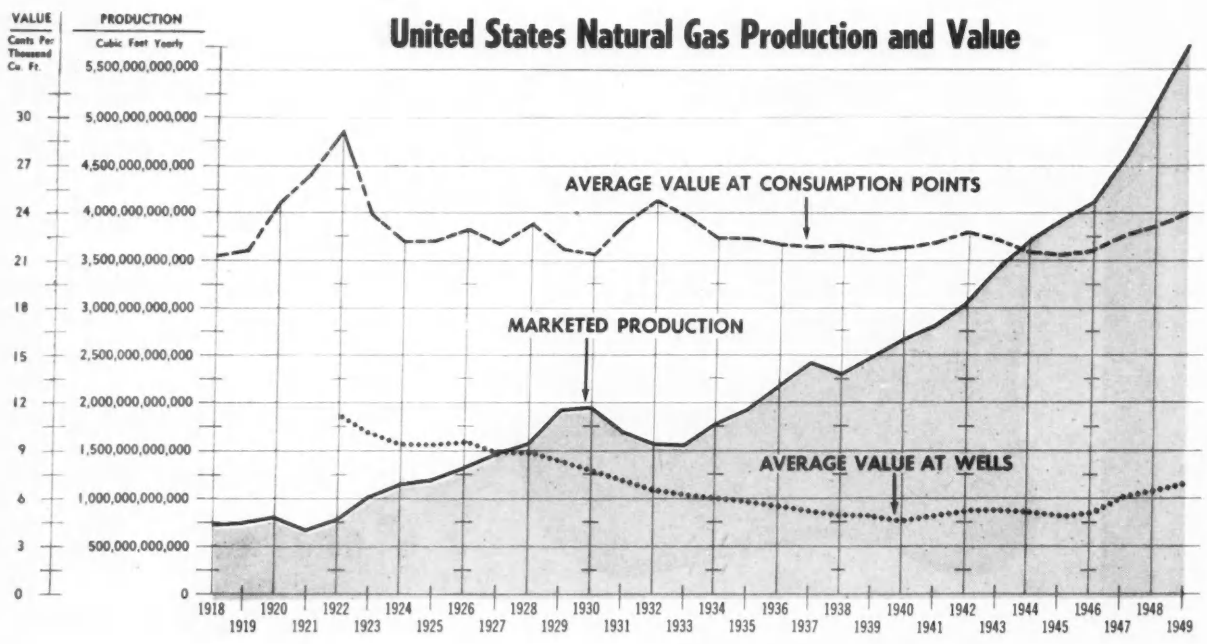
Will Continue Record Expansion

NATURAL gas reached new heights in 1949 as the spectacular expansion begun at the end of the war continued, and there is every reason to predict that 1950 will see the industry record one of the greatest advances in history.

Tremendous extension of natural gas transmission systems is scheduled to bring natural gas into new areas in 1950. In the six months ended June 30, 1949, the Federal Power Commission authorized construction of 4900 additional miles of gas pipe line to cost about $375 million. At the end of the year another 8500 miles were under construction, and applications were pending before FPC for an additional 14,600 miles. (Additional details on pipe line activity appear in the Pipe Line Section of this issue.) The American Gas Association has estimated that $1.8 billion will be spent by gas companies during the next three years.

Many new records were established by the gas industry in 1949. Marketed production was greater than ever before, utility sales to consumers reached a new high level, and revenues from sales were the greatest on record.

Preliminary figures indicate marketed production of natural gas in 1949 totaled 5¾ trillion cubic feet, an increase of more than 600 million cubic feet. At this level, marketed production was twice that of 1941 and 40 percent larger than in 1945. Total net production of natural gas, including volumes used in the field in addi-



YEAR	*No. of Producing Wells	Marketed Production (Millions of Cubic Feet)	Average Value (Cents per Thousand Cubic Feet) At Wells	Average Value (Cents per Thousand Cubic Feet) At Points of Consumption
1918...	†40,369	721,001	‡	21.3
1919...	†41,500	745,916	‡	21.6
1920...	†42,700	798,210	‡	24.6
1921...	†43,900	662,052	‡	26.4
1922...	†45,100	762,546	11.1	29.1
1923...	†46,300	1,006,976	10.0	23.8
1924...	†47,500	1,141,521	9.3	22.2
1925...	†48,700	1,188,571	9.4	22.3
1926...	†49,900	1,313,019	9.5	22.9
1927...	†51,100	1,445,428	8.8	22.0
1928...	†52,300	1,568,139	8.9	23.2
1929...	53,545	1,917,693	8.2	21.6
1930...	55,020	1,943,421	7.6	21.4
1931...	55,756	1,686,436	7.0	23.3
1932...	54,160	1,555,990	6.4	24.7
1933...	53,660	1,555,474	6.2	23.7
1934...	54,130	1,770,721	6.0	22.3
1935...	53,700	1,916,595	5.8	22.4
1936...	53,960	2,167,802	5.5	22.0
1937...	55,050	3,407 620	5.1	21.9
1938...	53,770	2,295,562	4.9	21.8
1939...	53,530	2,476,756	4.9	21.6
1940...	53,880	2,660,222	4.5	21.7
1941...	55,500	2,812,658	4.9	22.1
1942...	56,150	3,053,475	5.1	22.7
1943...	57,200	3,414,689	5.2	22.3
1944...	58,780	3,711,039	5.1	21.5
1945...	60,660	3,918,686	4.9	21.4
1946...	‡	4,030,605	5.3	22.0
§1947..	‡	4,582,173	6.0	22.5
1948..	‡	5,148,020	6.5	23.2
1949..	‡	†5,766,000	†7.0	†24.0

Source: U. S. Bureau of Mines. *Only dry natural gas producing wells included. †Estimated. ‡Not available. §New basis; includes gas stored and lost in transmission.

tion to marketed quantities, probably reached 6.6 trillion cubic feet in 1949 as compared with 6 trillion cubic feet in the previous year.

Approximately 55 percent of the marketed production was for utility sales to consumers. The American Gas Association has estimated that utility sales of natural gas during 1949 totaled about 3,153,335 million cubic feet, an increase of 8.9 percent over the 2,894,650 million cubic feet sold for this purpose in 1948. Largest volume of sales was for industrial use, which accounted for 57 percent of the total. In addition to these utility sales, large volumes of gas were used at carbon black plants, petroleum refineries, for mixing with manufactured gas, and also for oil field drilling, pumping and gasoline plant operations.

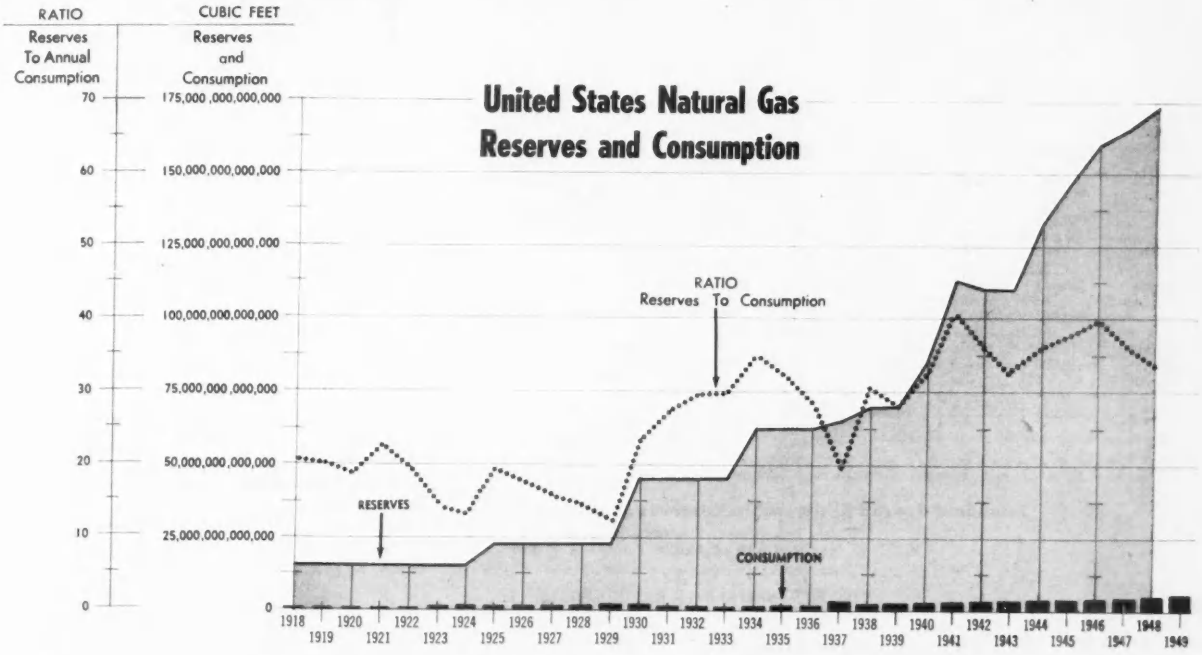
Total revenues from utility sales of natural gas, according to the association, reached an all-time high of $1,097,328,000, up 10.3 percent over 1948.

Estimates of the association indicate the natural gas utility industry was serving 13,319,000 customers at the end of 1949, an increase of 8 percent over the 12,327,000 served at the end of 1948. Residential customers totaled 12,198,000, or 91 percent of the total.

Meanwhile, despite increased yearly production, proved reserves of natural gas in the U. S. continue to climb to new

Natural Gas Customers, Sales and Revenues

	1949 Estimate	1948 Actual	Percent Change	Percent of Total 1949	Percent of Total 1948
Customers:					
Residential	12,198,600	11,292,700	8.0	91.6	91.6
Commercial	1,060,000	978,700	8.3	7.9	7.9
Industrial	50,500	46,900	7.7	.4	.4
Other	9,900	9,500	4.2	.1	.1
Total	13,319,000	12,327,800	8.0	100.0	100.0
Sales (Cubic Feet):					
Residential	905,823,000,000	832,205,000,000	8.8	28.7	28.8
Commercial	306,640,000,000	280,431,000,000	9.3	9.7	9.7
Industrial	1,821,503,000,000	1,668,437,000,000	9.2	57.8	57.6
Other	119,369,000,000	113,577,000,000	5.1	3.8	3.9
Total	3,153,335,000,000	2,894,650,000,000	8.9	100.0	100.0
Revenues:					
Residential	581,943,000	529,115,000	10.0	53.3	53.2
Commercial	146,382,000	131,556,000	11.3	13.2	13.2
Industrial	347,869,000	314,799,000	10.5	31.6	31.7
Other	21,134,000	19,371,000	9.1	1.9	1.9
Total	1,097,328,000	994,841,000	10.3	100.0	100.0



YEAR	Reserves at End of Year (Billions of Cubic Feet)	Authority for Estimate of Reserves	Consumption During Year (Marketed Production: Billions of Cubic Feet)	Years' Supply in Reserve
1918	15,000	E. Holley Poe et al in report	721	20.8
1919	15,000	September 23, 1947	746	20.1
1920	15,000	" " "	798	18.8
1921	15,000	" " "	662	22.7
1922	15,000	" " "	763	19.7
1923	15,000	" " "	1,007	14.9
1924	15,000	" " "	1,142	13.1
1925	23,000	*Gas Facts, 1945 and 1946*	1,189	19.3
1926	23,000	" "	1,313	17.5
1927	23,000	" "	1,445	15.9
1928	23,000	" "	1,568	14.7
1929	23,000	" "	1,918	12.0
1930	46,000	Earl P. Hines, then Cities Service	1,943	23.7
1931	46,000	Co.	1,686	27.3
1932	46,000	" " "	1,556	29.6
1933	46,000	" " "	1,555	29.6
1934	62,000	Ralph E. Davis, Consulting En-	1,771	35.0
1935	62,000	gineer	1,917	32.3
1936	62,000	" " "	2,168	28.6
1937	66,000	" " "	3,408	19.4
1938	70,000	Lyon F. Terry, Chase Nat'l Bank	2,296	30.5
1939	70,000	" " "	2,477	28.3
1940	85,000	Ralph E. Davis, Consulting Engineer	2,660	32.0
1941	113,800	Petroleum Administration for War	2,813	40.5
1942	110,000	" " "	3,053	36.0
1943	110,000	" " "	3,415	32.2
1944	133,500	" " "	3,711	36.0
1945	147,789	American Gas Association	3,919	37.7
1946	160,576	" "	4,031	39.8
*1947	165,927	" "	4,582	36.2
1948	173,869	" "	5,148	33.8
1949	No data		5,766	

* New basis: includes gas stored and lost in transmission.

Summary of Annual Estimates of U. S. Reserves of Natural Gas and Natural Gas Liquids

(Source: American Gas Association and American Petroleum Institute)
(Natural Gas data in Millions of Cubic Feet—14.65 psia, at 60° F.)
(Natural Gas Liquids in Thousands of Barrels of 42 U. S. Gallons.)

YEAR	ADDED DURING YEAR: Extensions and Revisions	Discoveries of New Fields and New Pools in Old Fields	Total of Discoveries, Revisions and Extensions	Net Change in Storage	Net Production During Year	Estimated Proved Reserves as of End of Year	Increase Over Previous Year
Natural Gas:							
1945	.....	.....	.....	.....	.....	147,789,367	.....
1946	*	*	17,729,152	*	4,942,617	160,575,901	12,786,535
1947	7,570,654	3,410,170	10,980,824	*	5,629,811	165,926,914	5,351,013
1948	9,769,483	4,129,089	13,898,572	51,482	6,007,628	173,869,340	7,942,426
Natural Gas Liquids:							
1946	.....	.....	.....	.....	129,262	3,163,219	.....
1947	192,237	59,301	251,538	.....	160,782	3,253,975	90,756
1948	405,874	64,683	470,557	.....	183,749	3,540,783	286,808

* Not estimated.

Estimated Proved Recoverable Reserves of Natural Gas Liquids in the United States, by States

Includes condensate, natural gasoline, and liquefied petroleum gas
(Source: American Gas Association and American Petroleum Institute)
(THOUSANDS OF BARRELS)

STATE	Reserves as of Dec. 31, 1947	CHANGES IN RESERVES DURING 1948: Extensions and Revisions	Discoveries of New Fields in Old Pools	Net Production	RESERVES AS OF DECEMBER 31, 1948: TOTAL	Non-Associated	Associated	Dissolved
Arkansas	58,259	3,220	249	4,271	57,457	36,468	7,926	13,063
California	312,151	20,088	2,149	26,480	307,908	.....	103,259	204,649
Colorado	7,942	27,834	537	14	36,299	537	.....	35,762
Illinois	17,920	10,152	.....	3,910	24,162	40	100	24,022
Indiana	65	71	.....	28	108	30	.....	78
Kansas	88,812	15,621	17	2,106	102,344	97,695	2,539	2,110
Kentucky	15,344	410	206	1,559	14,401	*14,401	.....	.....
Louisiana	462,814	67,206	16,113	22,037	524,096	382,319	95,908	45,869
Michigan	1,065	53	59	111	1,066	607	.....	459
Mississippi	58,659	721	942	2,758	57,564	24,563	27,641	5,360
Montana	1,360	2,840	.....	200	4,000	.....	4,000	.....
New Mexico	85,922	(—)5,756	4,342	4,261	80,247	23,879	30,902	25,466
Ohio	1,736	70	9	151	1,664	*1,664	.....	.....
Oklahoma	155,003	53,685	8,225	16,525	200,388	95,869	16,436	88,083
Pennsylvania	2,236	467	233	291	2,645	*2,645	.....	.....
Texas	1,957,063	180,126	31,204	93,719	2,074,674	1,314,800	297,052	462,822
Utah	200	.....	30	21	209	209	.....	.....
West Virginia	17,521	1,076	359	3,742	15,214	*15,214	.....	.....
Wyoming	9,900	27,971	.....	1,564	36,307	12,191	.....	24,116
†Miscellaneous	3	19	9	1	30	24	.....	6
Total	3,253,975	405,874	64,683	183,749	3,540,783	2,023,155	585,763	931,865

* Not allocated by types, but occurring principally in column shown.
† Includes Alabama, Florida, Missouri, Nebraska, New York and Virginia.

levels. The American Gas Association estimated that proved recoverable reserves at the end of 1948 amounted to 173.8 trillion cubic feet, an increase of 7.9 trillion cubic feet over the previous year. Data are not yet available for the end of 1949. Reserves the end of 1948 represented an increase of 26 trillion cubic feet since 1945, when the association began making annual studies of proved gas reserves.

Several important gas fields were discovered during the past year, and when the American Gas Association's Reserve Committee makes its annual report for 1949, it probably will reflect another gain in U. S. natural gas reserves.

Of the estimated 173.8 trillion cubic feet of proved natural gas reserves existing at the end of 1948, Texas was credited with 95¾ trillion cubic feet or more than than one-half. Louisiana with just less than 24 trillion cubic feet ranked second in volume of reserves.

For the first time in history, New York City in 1949 was served with natural gas produced in Texas and made available to the Staten Island area. The remaining boroughs of New York will begin receiving Texas produced gas by the end of 1950 with completion of an 1840-mile pipe line now being constructed at a cost of 190 million dollars. This line will supply 505 million cubic feet of gas to metropolitan New York and Newark, N. J.

Several natural gas transmission companies are working on plans for bringing natural gas to New England states. This highly industrialized area now is served entirely with manufactured gas, coal and heating oil.

(See Table On Page 131)

Estimated Proved Recoverable Reserves of Natural Gas in the United States, by States

(Source: American Gas Association)
(Millions of Cubic Feet—14.65 psia, at 60° F.)

STATE	Reserves as of Dec. 31, 1947	CHANGES IN RESERVES DURING 1948 (b): Extensions and Revisions	Discoveries of New Fields and New Pools in Old Fields	Net Change in Underground Storage (c)	Net Production (d)	RESERVES AS OF DECEMBER 31, 1948 (b): TOTAL	Non-Assoc. (e)	Associated (f)	Dissolved (g)	Underground Storage (h)
Arkansas	890,149	73,969	3,484	(—) 10	65,754	901,838	457,906	161,919	280,568	1,445
California	10,164,356	498,673	111,257	(—) 2,699	578,994	10,192,593	2,911,991	3,052,802	4,215,775	12,025
Colorado	331,866	621,577	408,148	.....	12,412	1,349,179	586,757	40,939	721,483	.....
Illinois	221,131	43,310	.....	.....	36,637	227,804	7,967	20,000	199,837	.....
Indiana	13,000	14,104	.....	.....	5,504	21,600	6,000	.....	15,600	.....
Kansas	14,556,916	124,304	2,385	1,213	276,986	14,407,832	13,959,636	210,292	211,035	26,869
Kentucky	1,379,480	69,775	9,000	7,896	88,000	1,378,151	1,295,122	.....	73,000	10,029
Louisiana	23,481,233	532,638	722,859	.....	759,210	23,977,520	18,909,691	3,490,004	1,577,825	.....
Michigan	168,469	14,490	11,705	10,461	22,138	182,987	121,502	.....	45,876	15,609
Mississippi	2,452,760	54,413	52,423	.....	55,260	2,504,336	1,743,948	464,632	295,756	.....
Montana	700,510	189,244	1,966	1,575	40,690	852,605	485,030	337,121	28,879	1,575
New Mexico	5,990,283	(—)214,670	108,930	989	279,171	5,606,361	2,824,102	1,991,862	786,557	3,840
New York	64,900	4,098	.....	3,073	4,456	67,615	59,720	.....	725	7,170
Ohio	611,200	57,780	7,880	13,325	60,732	629,453	542,608	.....	38,500	48,345
Oklahoma	11,350,864	447,543	208,636	(—) 283	674,315	11,332,445	7,660,624	1,125,136	2,534,088	12,597
Pennsylvania	483,063	182,967	12,000	13,972	74,592	617,410	530,721	.....	45,750	40,939
Texas	90,025,566	6,563,060	1,830,349	.....	2,710,422	95,708,553	68,663,367	16,725,023	10,320,163	.....
Utah	66,670	.....	10,000	.....	6,872	69,798	69,798	.....	.....	.....
West Virginia	1,780,735	123,462	37,000	1,970	206,000	1,737,167	1,622,235	.....	89,500	25,432
Wyoming	1,191,788	363,063	588,067	.....	49,178	2,093,740	927,796	257,308	908,636	.....
Miscellaneous (a)	1,975	5,683	3,000	.....	305	10,353	7,993	.....	2,360	.....
Total	165,926,914	9,769,483	4,129,089	51,482	6,007,628	173,869,340	123,394,514	27,877,038	22,391,913	205,875

(a) Includes Alabama, Florida, Missouri, Nebraska and Virginia. (b) Excludes shrinkage caused by natural gas liquids recovery. (c) The net difference between gas stored in and gas withdrawn from underground storage reservoirs. (d) Net production equals gross withdrawls less gas injected into underground reservoirs; changes in underground storage are excluded. (e) Non-associated gas is free gas not in cantact with crude oil in the reservoirs. (f) Associated gas is free gas in contact with crude oil in the reservoirs. (g) Dissolved gas is gas in solution with crude oil in the reservoirs. (h) Gas held in underground reservoirs for storage purposes only.

United States Marketed Production of Natural Gas, By States, By Years

(Millions of Cubic Feet)

Sources: U. S. Bureau of Mines, except for some figures for early years which are from "Petroleum in the United States and Possessions" by Ralph Arnold and William Kemnitzer and except where otherwise indicated in footnotes.

YEAR	Arkansas	California	Colorado	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Montana	New Mexico	New York
*Pre-1906..	281	9,810	631	1,505	471,800	81,865	13,243	31	.....	.....	.....	.....	31,340
1906..	21	153	23	410	7,861	69,323	789	39	.....	.....	.....	.....	2,548
1907..	*570	230	57	1,155	6,624	76,707	1,303	88	.....	.....	.....	.....	3,288
1908..	*1,208	479	50	4,979	5,256	80,740	1,430	252	.....	.....	.....	.....	3,843
1909..	*1,778	2,324	*45	8,473	6,159	75,074	2,097	1,365	1	.....	.....	.....	4,696
1910..	*2,412	2,764	*40	6,723	5,760	59,380	1,357	4,110	1	.....	.....	.....	6,010
1911..	*1,994	6,390	*35	6,762	4,365	38,800	1,275	9,786	2	.....	.....	.....	5,240
1912..	*1,465	9,355	*30	5,603	3,618	28,068	1,951	14,493	2	.....	.....	.....	8,626
1913..	*806	11,035	*27	4,767	2,921	22,884	1,821	26,653	2	.....	.....	.....	8,515
1914..	*633	17,829	*24	3,548	2,580	22,628	1,422	26,775	2	.....	.....	.....	8,935
1915..	992	21,891	*21	2,690	2,261	27,046	1,667	25,540	2	.....	6	.....	7,977
1916..	2,388	31,643	*18	3,534	1,715	31,710	2,107	32,081	1	.....	213	.....	8,036
1917..	5,610	49,427	*14	4,439	1,712	24,439	2,802	31,287	1	.....	334	.....	8,372
1918..	5,295	39,719	10	4,473	1,667	27,825	3,022	36,094	1	.....	177	.....	8,461
1919..	5,587	55,607	10	3,825	1,407	16,150	2,057	47,062	1	.....	858	.....	8,124
1920..	9,027	66,041	8	3,013	1,779	21,158	3,345	58,274	.....	.....	818	.....	8,419
1921..	4,260	75,942	4	2,646	1,066	15,717	4,820	58,004	.....	.....	336	.....	6,583
1922..	9,700	84,580	4	3,383	947	20,289	5,872	70,267	1	.....	486	.....	6,947
1923..	24,215	131,434	1	4,049	880	30,913	11,953	112,031	1	.....	1,470	.....	6,497
1924..	36,616	189,692	48	4,072	998	25,580	12,875	160,945	1	.....	1,071	.....	6,196
1925..	41,878	187,789	574	4,165	1,168	26,917	10,770	152,620	.....	.....	1,496	.....	6,210
1926..	43,566	204,915	554	3,808	901	38,095	10,410	157,423	.....	.....	2,283	921	7,027
1927..	30,450	212,364	1,725	3,741	1,124	42,646	10,206	186,961	1	.....	4,253	1,019	5,908
1928..	20,235	246,215	2,931	3,051	1,290	45,644	15,383	227,821	469	.....	6,277	838	7,224
1929..	19,928	342,214	2,787	2,983	1,012	38,469	27,588	261,138	4,526	90	9,659	3,054	8,387
1930..	18,585	334,789	3,312	2,890	1,217	37,630	28,023	278,341	2,075	179	10,060	9,497	9,624
1931..	13,300	305,930	2,536	2,130	1,337	38,742	27,870	224,155	472	6,048	10,949	19,354	7,868
1932..	10,235	263,484	2,547	1,769	1,349	40,690	29,005	201,561	968	8,648	13,295	17,604	8,813
1933..	8,288	259,799	2,449	1,631	1,544	41,596	31,380	197,826	1,528	8,679	14,391	19,148	6,865
1934..	7,024	268,122	2,633	1,868	1,802	46,909	33,124	225,713	2,789	8,245	14,971	24,075	6,278
1935..	6,167	284,109	2,843	1,448	1,777	57,125	39,738	249,450	4,203	9,643	19,870	27,931	8,288
1936..	8,500	320,406	3,687	865	2,241	69,178	43,903	290,151	7,167	11,821	23,003	33,928	12,431
1937..	9,690	329,769	3,186	1,040	1,551	83,890	55,719	315,301	9,080	13,348	24,765	46,337	21,325
1938..	11,301	315,168	1,904	1,169	1,299	75,203	46,163	283,899	10,165	13,656	21,216	50,706	39,402
1939..	10,107	348,361	2,015	2,746	791	80,556	47,771	294,370	10,726	14,527	23,178	60,284	29,222
1940..	14,379	351,950	2,533	8,359	1,137	90,003	53,056	343,191	12,648	6,365	26,231	63,990	12,187
1941..	19,148	374,905	3,256	10,053	1,522	111,121	69,067	403,855	13,916	4,268	28,499	64,655	10,456
1942..	19,456	403,968	4,865	14,484	1,599	112,921	80,089	447,686	15,521	2,082	31,475	78,164	8,718
1943..	36,469	457,757	6,445	18,120	1,450	133,729	92,364	505,294	18,006	1,461	31,562	86,500	8,062
1944..	46,453	502,017	5,141	18,137	1,014	157,733	94,223	534,688	19,653	1,352	32,102	87,727	7,052
1945..	46,600	502,442	4,914	16,663	1,543	145,959	81,714	542,789	21,874	4,587	31,829	105,023	9,210
1946..	45,177	487,904	6,728	17,166	1,094	165,725	70,396	525,178	20,879	7,225	30,713	119,262	5,084
1947..	50,440	544,950	8,259	16,679	666	202,177	80,040	573,151	25,479	39,987	32,549	142,566	4,776
†1947..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1948..	53,946	570,954	8,967	14,062	553	245,189	70,095	686,061	14,981	59,899	36,551	194,749	4,705
1949..	‡	‡	‡	‡	‡	‡	†	‡	‡	‡	‡	‡	‡
Total....	706,180	9,226,626	87,891	249,076	562,357	2,924,142	1,225,305	8,823,800	217,145	222,110	486,946	1,257,332	413,775

YEAR	Ohio	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Others	Total United States	VALUE AT WELLS: Total (Thousands of Dollars)	VALUE AT WELLS: Average Per M Cubic Ft. (Cts.)	VALUE AT POINTS OF CONSUMPTION: Total (Thousands of Dollars)	VALUE AT POINTS OF CONSUMPTION: Average Per M Cubic Ft. (Cts.)
*Pre-1906..	305,593	2,215	1,611,066	815	387,799	506	43,281	**2,961,781**	.....	....	426,448	14.4
1906..	45,436	3,520	138,161	*1,000	119,400	*100	59	**388,843**	.....	....	46,874	12.1
1907..	52,041	4,867	135,516	*1,200	122,687	*140	149	**406,622**	.....	....	54,222	13.3
1908..	47,442	11,925	130,476	*1,500	112,181	*180	200	**402,141**	.....	....	54,640	13.6
1909..	53,223	28,037	127,697	*3,000	166,435	*220	82	**480,706**	.....	....	63,207	13.1
1910..	48,232	50,430	126,867	*4,000	190,706	*253	110	**509,155**	.....	....	70,756	13.9
1911..	49,450	67,276	108,869	5,503	206,891	*265	90	**512,993**	.....	....	74,622	14.5
1912..	56,210	73,799	112,150	7,470	239,007	*247	109	**562,203**	.....	....	84,564	15.0
1913..	50,612	75,018	118,860	12,160	245,454	*273	90	**581,898**	.....	....	87,847	15.1
1914..	68,270	78,167	110,745	13,434	236,489	*306	80	**591,867**	.....	....	94,116	15.9
1915..	79,510	87,517	113,692	13,324	244,004	*321	118	**628,579**	.....	....	101,312	16.1
1916..	69,888	123,517	130,484	15,810	299,319	*557	149	**753,170**	.....	....	120,227	16.0
1917..	68,917	137,384	133,397	17,047	308,617	*1,209	102	**795,110**	.....	....	142,089	17.9
1918..	61,261	124,317	123,813	13,440	265,161	4,339	1,926	**721,001**	.....	....	153,554	21.3
1919..	63,153	163,649	113,489	24,710	234,095	6,014	118	**745,916**	.....	....	160,888	21.6
1920..	58,938	154,467	125,787	37,063	239,719	10,312	42	**798,210**	.....	....	196,194	24.6
1921..	47,412	124,058	86,144	44,504	174,921	15,608	27	**662,052**	.....	....	174,617	26.4
1922..	51,481	140,631	101,276	47,945	195,288	23,427	22	**762,546**	84,873	11.1	221,535	29.1
1923..	53,812	203,082	112,562	74,535	203,867	35,523	151	**1,006,976**	100,849	10.0	240,001	23.8
1924..	47,396	214,452	105,863	107,247	182,285	46,036	148	**1,141,521**	105,779	9.3	253,856	22.2
1925..	43,235	249,285	101,632	134,872	180,345	45,539	76	**1,188,571**	112,047	9.4	265,271	22.3
1926..	47,363	286,421	107,089	175,392	180,223	46,567	61	**1,313,019**	124,693	9.5	300,168	22.9
1927..	51,381	326,864	105,709	254,063	162,375	43,582	1,056	**1,445,428**	127,468	8.8	317,930	22.0
1928..	56,341	320,861	99,466	301,990	163,018	47,490	1,595	**1,568,139**	139,898	8.9	363,726	23.2
1929..	57,936	357,893	101,951	464,928	167,333	44,648	1,169	**1,917,693**	157,596	8 2	413,276	21.6
1930..	63,394	348,116	88,706	517 880	144,180	43,219	1,704	**1,943,421**	147,048	7.6	416,090	21.4
1931..	56,326	263,685	74,797	464,580	124,797	39,770	1,790	**1,686,436**	117,505	7.0	392,816	23.3
1932..	51,466	255,487	61,611	456,832	100,540	28,938	1,148	**1,555,990**	98,985	6.4	384,632	24.7
1933..	47,929	245,759	63,579	475,691	100,653	25,830	909	**1,555,474**	97,096	6.2	368,540	23.7
1934..	50,330	254,457	86,238	602,976	109.161	23,148	858	**1,770,721**	106,438	6.0	395,378	22.3
1935..	49,592	274,313	94,464	642,366	115,772	26,643	853	**1,916,595**	110,402	5.8	429,374	22.4
1936..	46,994	280,481	110,362	734,561	138,076	29,322	725	**2,167,802**	119,193	5.5	476,813	22.0
1937..	42,783	296,260	115,928	854,561	149,084	31,023	2,980	**2,407,620**	123,457	5.1	528,354	21.9
1938..	35,257	263,164	76,547	882,473	134,342	26,678	5,850	**2,295,562**	113,571	4.9	500,698	21.8
1939..	36,469	250,875	93,882	979,427	159,226	26,614	5,609	**2,476,756**	120,243	4.9	534,240	21.6
1940..	40,639	257,626	90,725	1,063,538	188,751	27,346	5,568	**2,660,222**	120,493	4.5	577,939	21.7
1941..	41,858	234,054	92,819	1,086,312	207,681	29,284	5,929	**2,812,658**	138,508	4.9	621,338	22.1
1942..	45,055	269,704	93,532	1,170,345	215,193	33,124	5,494	**3,053,475**	154,236	5.1	692,737	22.7
1943..	52,001	285,045	93,543	1,323,885	223,787	34,351	4,858	**3,414,689**	176,893	5.2	760,950	22.3
1944..	51,724	310,888	92,987	1,525,515	181,452	34,521	6,660	**3,711,039**	189,263	5.1	797,873	21.5
1945..	49,967	357,530	82,188	1,711,401	160,225	35,282	6,946	**3,918,686**	192,016	4.9	838,599	21.4
1946..	61,570	380,938	92,443	1,776,148	178,958	33,266	4 751	**4,030,605**	213,622	5.3	886,733	22.0
1947..	73,989	393,216	94,252	1,932,857	182,072	40,083	6,505	**4,444,693**	266,682	6.0	1,031,169	23.2
†1947..	.....	.....	.....	.....	.....	.....	.....	**†4,582,173**	†274,930	†6.0	†1,031,169	†22.5
1948..	65,619	480,573	87,578	2,289 923	203,681	52,424	7,510	**5,148,020**	334,621	6 5	1,193,529	23.2
1949..	‡	‡	‡	‡	‡	‡	‡	***5,766,000**	*402,000	*7.0	*1,385,000	*24.0
§Total...	2,597,495	9,111,823	6,068,942	22,268,223	8,245,250	994.528	127,657	**81,582,604**	‡	‡	17,694,737	21.7

* Estimate. † Data for 1947 on new basis, for comparison with subsequent years; not included below in totals; includes gas stored and lost in transmission; details by states not available. ‡ Not available. § State totals only through 1948; U. S. total through 1949, with 1947 on old and not new basis.

NATURAL GASOLINE OUTPUT

Rises 50 Percent in Five Years

U. S. PRODUCTION of natural gasoline and allied products continued to rise during 1949, attaining another new all-time peak. With additional plants scheduled for completion, an even higher volume is indicated for the forthcoming year.

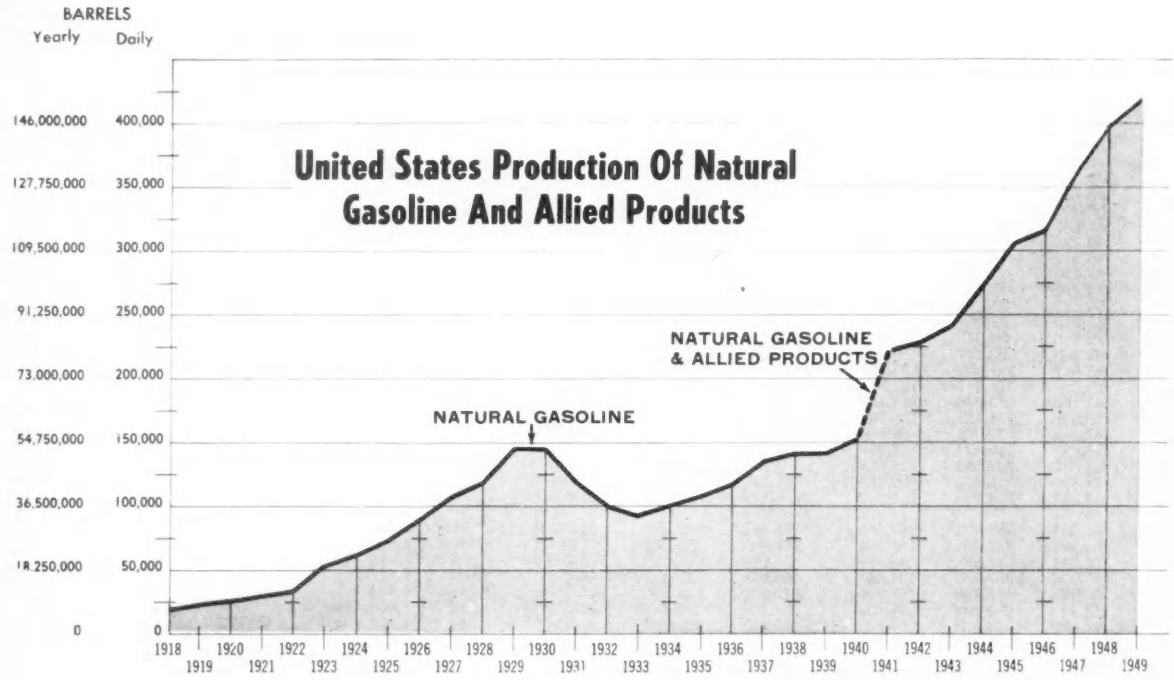
The growth in U. S. natural gasoline-allied product production has been phenomenal in recent years, the 1949 rate being more than 50 percent greater than the 1944 volume. Annual output the past year totaled 156,233,000 barrels, an increase of 10¾ million barrels, or 7.4 percent, over 1948 quantities. Daily average production in 1949 was 428,032 barrels, up 30,548 barrels over the 397,484 barrel-per-day average of 1948. This rate of increase was not quite as great as during 1948, when there was an advance of 13,306 barrels daily, or 10.1 percent, over 1947.

Natural gasoline and allied products production in 1950 should total approximately 165,640,000 barrels, or a daily average of 453,808 barrels. This would represent an increase of 25,776 barrels per day over the 1949 rate.

Texas continued to lead all states in production, and also accounted for the largest portion of the increased yield achieved by the nation. This state produced an average of 211,000 barrels daily of natural gas liquids during 1949, or practically half the entire U. S. output. This compared with 194,000 barrels produced daily in 1948.

California, Louisiana and Oklahoma, in that order, were the next most important producing regions of natural gas liquids, and all produced more the past year than in 1948. California's output was 74,000 barrels daily compared with 72,000 barrels the previous year. Louisiana advanced from 46,000 barrels to 50,000 barrels daily, while Oklahoma was climbing from 30,000 to 35,000 barrels per day.

The four large producing states produced 370,000 barrels of the nation's 428,000 barrels daily production in 1949, in contrast with producing 342,000 barrels of the 397,000 barrels produced by the country in 1948.



(All Figures in Barrels)

YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average
1918	6,727,000	18,430	1926	32,455,000	88,917	1934	36,556,000	100,154	1942	83,322,000	228,279
1919	8,370,000	22,931	1927	39,075,000	107,054	1935	39,333,000	107,762	1943	87,716,000	240,318
1920	9,161,000	25,029	1928	43,191,000	118,009	1936	42,770,000	116,858	1944	100,046,000	273,350
1921	10,713,000	29,350	1929	53,183,000	145,707	1937	49,177,000	134,732	1945	112,004,000	306,861
1922	12,044,000	32,997	1930	52,631,000	144,194	1938	51,347,000	140,677	1946	115,739,000	317,093
1923	19,434,000	53,244	1931	43,617,000	119,499	1939	51,650,000	141,507	1947	132,173,000	362,118
1924	22,235,000	60,751	1932	36,281,000	99,128	1940	55,700,000	152,186	1948	145,479,000	397,484
1925	26,845,000	73,547	1933	33,810,000	92,630	(*) Natural Gasoline and Allied Prod			1949	156,232,000	428,032
						1941	80,855,000	221,521	1950 Est	165,640,000	453,808

* Bureau began a new series covering 1941 and subsequent year, which includes cycle condensate.

Production of Natural Gasoline and Allied Products, By States, By Years

(Natural Gasoline, Cycle Products, and Liquefied Petroleum Gases)

(THOUSANDS OF GALLONS)

YEAR	Arkansas	California	Colorado	Illinois	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Montana	New Mexico
Natural Gasoline:											
1911	.....	50	.....	*145	.....	.....	.....	.....	.....	.....	.....
1912	.....	1,041	.....	*290	.....	.....	.....	.....	.....	.....	.....
1913	.....	3,461	.....	*581	*2	.....	.....	.....	.....	.....	.....
1914	.....	7,581	.....	1,164	*8	.....	.....	.....	.....	.....	.....
1915	.....	12,835	.....	1,035	*40	.....	210	.....	.....	.....	.....
1916	.....	17,159	.....	2,260	215	725	2,113	.....	.....	.....	.....
1917	.....	28,818	.....	4,934	1,175	3,818	4,980	.....	.....	.....	.....
1918	.....	32,269	2	4,575	2,390	3,331	7,021	.....	.....	.....	.....
1919	.....	40,386	.....	6,060	3,284	5,136	10,063	.....	.....	.....	.....
1920	.....	48,208	.....	6,055	4,331	4,497	10,610	.....	.....	.....	.....
1921	.....	58,220	.....	7,536	3,587	4,242	15,341	.....	.....	.....	.....
1922	4,289	67,120	.....	7,700	2,856	5,205	29,406	.....	.....	.....	.....
1923	16,183	173,329	.....	7,356	8,775	7,601	40,720	.....	.....	.....	.....
1924	17,533	232,579	.....	9,091	11,658	7,274	48,098	.....	.....	.....	.....
1925	19,686	303,180	35	9,874	19,592	7,685	43,489	.....	.....	.....	.....
1926	30,385	389,366	276	9,987	25,369	7,689	43,557	.....	.....	.....	1,488
1927	37,498	498,020	912	8,853	36,095	7,480	44,844	.....	.....	.....	1,827
1928	32,677	584,111	1,909	7,817	36,765	7,267	55,022	.....	.....	.....	1,506
1929	33,455	840,325	1,630	7,080	36,227	6,006	64,957	.....	.....	.....	1,077
1930	30,637	829,713	1,322	6,867	35,106	6,641	73,693	.....	.....	.....	3,663
1931	26,282	680,399	659	5,024	32,690	5,464	58,034	.....	.....	.....	17,775
1932	18,653	551,897	472	4,558	24,792	4,877	46,199	.....	.....	.....	17,507
1933	15,215	496,293	408	3,673	24,869	4,514	36,973	188	.....	1,295	19,149
1934	13,033	506,272	643	3,810	27,891	4,171	40,558	589	.....	1,237	21,748
1935	13,076	534,624	417	2,642	32,507	5,614	49,732	1,850	.....	1,739	19,563
1936	11,957	593,416	451	2,337	37,775	6,009	72,687	2,015	.....	2,071	28,921
1937	11,285	623,894	404	2,567	57,026	7,344	106,415	2,408	.....	2,296	38,253
1938	25,648	660,890	386	2,436	55,988	7,040	95,634	3,581	.....	1,768	49,596
1939	24,634	607,237	390	4,012	62,175	7,785	94,090	2,971	.....	2,161	54,707
1940	32,096	587,476	380	21,499	64,691	9,539	113,741	3,919	.....	2,603	55,713
1941	28,108	577,127	390	54,872	72,876	10,247	201,049	5,670	.....	2,517	69,115
Cumulative	442,330	10,587,236	11,086	216,750	720,755	157,201	1,409,236	23,191	.....	17,687	401,608
Natural Gasoline and Allied Products:											
1941	34,389	659,765	390	93,165	85,691	35,371	225,724	5,670	.....	3,966	81,000
1942	42,677	633,326	346	139,323	81,828	36,682	296,074	2,518	.....	4,517	89,164
1943	56,837	693,332	†	185,487	85,206	43,317	306,062	1,226	.....	4,664	81,005
1944	75,536	771,280	†	194,369	69,834	48,742	492,659	8,500	.....	4,768	81,161
1945	85,941	891,753	†	175,992	72,637	46,879	549,234	13,630	.....	4,726	97,800
1946	84,507	910,538	840	161,560	82,591	53,862	566,796	12,337	.....	4,597	103,642
1947	94,066	1,064,108	997	162,504	99,195	59,713	628,845	4,287	19,942	5,756	113,051
1948	94,500	1,112,069†	.....	148,995	101,960	66,589	706,178	2,517	45,506	8,449	131,578
1949, Total	**95,531**	**1,136,849†**	.....	**136,851**	**112,569**	**68,619**	**765,088**	**3,251**	**50,286**	**9,474**	**169,115**
(Daily Average)	262	3,115	.....	375	308	188	2,096	9	138	26	463
1949, Thousand Barrels	2,275	27,068	.....	3,258	2,680	1,634	18,216	78	1,197	226	4,027
(Daily Average)	6	74	.....	9	7	5	50	.....	3	1	11

YEAR	New York	Ohio	Oklahoma	Pennsylvania	Texas	Utah	West Virginia	Wyoming	Others	Total	VALUE AT PLANTS: Thousands of Dollars	VALUE AT PLANTS: Av. Per Gallon (Cents)
Natural Gasoline:												
1911	.....	1,679	388	1,467	.....	.....	3,660	.....	37	7,426	$ 532	7.2
1912	.....	1,719	1,575	2,041	.....	.....	5,318	.....	97	12,081	1,157	9.6
1913	.....	2,073	6,463	3,680	.....	.....	7,662	.....	139	24,061	2,458	10.2
1914	.....	2,440	17,278	4,612	.....	.....	9,278	.....	292	42,653	3,106	7.3
1915	.....	2,199	31,666	5,899	*130	.....	10,854	.....	497	65,365	5,151	7.9
1916	249	2,639	48,360	9,715	1,293	.....	18,765	.....	.....	103,493	14,331	13.8
1917	181	5,440	115,123	13,826	6,920	.....	32,669	.....	.....	217,884	40,189	18.4
1918	218	6,745	163,701	15,775	7,326	.....	37,604	1,579	.....	282,536	50,364	17.8
1919	458	8,801	189,995	20,284	93,387	.....	52,150	5,581	.....	351,535	64,197	18.3
1920	411	10,016	178,857	21,151	32,956	.....	58,941	8,711	.....	384,744	71,788	18.7
1921	366	9,100	185,341	19,856	77,141	.....	54,646	14,558	.....	449,934	61,815	13.7
1922	506	8,600	189,404	18,518	95,405	.....	56,796	19,967	.....	505,832	72,711	14.4
1923	408	10,035	270,249	19,132	177,765	.....	63,381	21,292	.....	816,226	77,268	9.5
1924	477	9,443	301,062	19,254	186,571	.....	61,549	29,272	.....	933,861	82,233	8.8
1925	414	8,701	390,861	18,850	214,092	.....	58,201	32,777	33	1,127,470	120,383	10.7
1926	539	10,817	475,716	20,343	243,093	.....	63,807	40,625	33	1,363,090	136,412	10.0
1927	449	12,167	548,109	16,744	320,723	.....	64,192	43,212	19	1,641,144	118,688	7.2
1928	392	13,174	619,691	16,571	324,516	.....	69,729	42,861	26	1,814,034	138,944	7.7
1929	264	11,166	676,030	18,411	419,485	.....	72,944	44,544	37	2,233,688	158,410	7.1
1930	208	8,937	591,194	16,713	491,299	.....	63,328	51,132	41	2,210,494	128,160	5.8
1931	132	5,199	454,886	14,339	426,695	.....	52,844	51,523	33	1,831,918	63,732	3.5
1932	117	5,163	378,584	11,685	371,106	.....	43,773	44,391	26	1,523,800	49,244	3.2
1933	96	4,662	360,488	11,686	366,515	.....	39,848	34,103	25	1,420,000	54,368	3.8
1934	85	5,881	355,438	10,781	466,570	.....	41,854	34,799	.....	1,535,360	60,523	3.9
1935	27	6,232	379,913	12,623	516,748	.....	42,433	32,246	.....	1,651,986	70,940	4.3
1936	22	6,991	418,591	14,267	520,547	.....	44,389	33,894	.....	1,796,340	84,572	4.7
1937	33	7,704	492,290	13,940	615,281	.....	50,379	33,915	.....	2,065,434	97,125	4.7
1938	27	7,382	468,499	10,734	685,920	.....	50,398	30,647	.....	2,156,574	87,266	4.0
1939	34	7,445	436,123	11,756	770,047	.....	52,272	31,461	.....	2,169,300	90,050	4.2
1940	17	8,062	399,369	15,371	932,040	.....	58,782	34,102	.....	2,339,400	68,261	2.9
1941	17	8,217	362,247	15,440	1,180,221	.....	65,873	34,728	.....	2,688,714	105,815	3.9
Cumulative	6,147	218,829	9,507,491	425,464	9,459,742	.....	1,408,369	751,920	1,335	35,766,377	$2,180,193	6.1
Natural Gasoline and Allied Products:												
1941	17	8,217	453,383	16,011	1,558,819	.....	98,044	36,288	.....	3,395,910	119,120	3.5
1942	15	6,975	445,115	15,294	1,567,830	.....	101,828	36,012	.....	3,499,524	121,565	3.5
1943	12	6,495	422,313	17,534	1,646,031	.....	97,942	†36,609	.....	3,684,072	146,910	4.0
1944	12	7,282	421,768	17,495	1,870,419	.....	88,917	†49,190	.....	4,201,932	183,500	4.3
1945	8	6,452	416,184	14,181	2,188,305	.....	87,609	†52,842	.....	4,704,173	187,564	4.0
1946	9	6,253	414,991	11,003	2,282,979	.....	120,444	43,506	.....	4,861,033	180,281	3.7
1947	11	7,084	446,493	13,013	2,639,434	685	141,273	50,810	.....	5,551,267	287,000	5.2
1948	11	6,355	470,141	12,253	2,984,389	†	157,342	†61,295	.....	6,110,127	463,618	7.6
1949, Total	**9**	**5,320**	**529,925**	**10,135**	**3,239,295**	†	**162,631**	**†66,780**	.....	**6,561,728**	**389,000**	**5.9**
(Daily Average)	.....	14	1,452	28	8,875	.....	445	183	.....	17,977	1,066	5.9
1949, Thousand Bbls	.....	127	12,617	241	77,126	.....	3,872	1,590	.....	156,232	.....	.....
(Daily Average)	.....	.....	35	1	211	.....	11	4	.....	428	.....	.....

* Estimate. † Wyoming includes drip gasoline in Colorado in 1943, 1944, and 1945, and in Colorado and Utah in 1948 and 1949.

Proved PETROLEUM RESERVES Increased

Estimated Changes in U. S. Oil Reserves in 1949 and Comparisons with Earlier Years

Data for 1949 estimated by WORLD OIL; earlier years by American Petroleum Institute and American Gas Association

(THOUSANDS OF BARRELS)

YEAR	Estimated Proved Reserves Beginning of Year	CHANGES DURING YEAR (Addition) Reserves Proved During Year	CHANGES DURING YEAR (Deduction) *Production During Year	CHANGES DURING YEAR Net Change in Reserves (Increase or Decrease)	Estimated Proved Reserves at End of Year	Ratio of Year-End Reserves to Year's Production (Year's Supply)
CRUDE OIL:						
1949	23,280,444	3,556,575	†1,819,109	+1,737,466	25,017,910	13.8
1948	21,487,685	3,795,207	2,002,448	+1,792,759	23,280,444	11.6
1947	20,873,560	2,464,570	1,850,445	+ 614,125	21,487,685	11.6
1946	19,941,846	2,658,062	1,726,348	+ 931,714	20,873,560	12.1
1945	19,784,530	1,870,971	1,713,655	+ 157,316	19,941,846	11.6
NATURAL GAS LIQUIDS (Condensate, Natural Gasoline, Liquefied Petroleum Gases)						
1949	3,540,783	525,000	‡198,738	+ 326,262	3,867,045	19.5
1948	3,253,975	470,557	183,749	+ 286,808	3,540,783	19.3
1947	3,163,219	251,538	160,782	+ 90,756	3,253,975	20.2
1946	.....	.....	.....	.....	3,163,219	....
TOTAL LIQUID HYDROCARBONS						
1949	26,821,227	4,081,575	2,017,847	+2,063,728	28,884,955	14.3
1948	24,741,660	4,265,764	2,186,197	+2,079,567	26,821,227	12.3
1947	24,036,779	2,716,108	2,011,227	+ 704,881	24,741,660	12.3
1946	.....	.....	.....	.....	24,036,779	...

* Production for each year except 1949 partly estimated by API and AGA reserves committees, but small variance from later totals from government sources is compensated by revision when reserves report for succeeding year is compiled. Data for 1949 estimated by WORLD OIL, with aid of Bureau of Mines and API reports.

† Crude oil only, not including 20,506 lease condensate fed into pipe lines with crude oil.

‡ Includes 156,232 plant production of natural gasoline, etc.; 20,506 lease condensate; estimated 22,000 losses and waste.

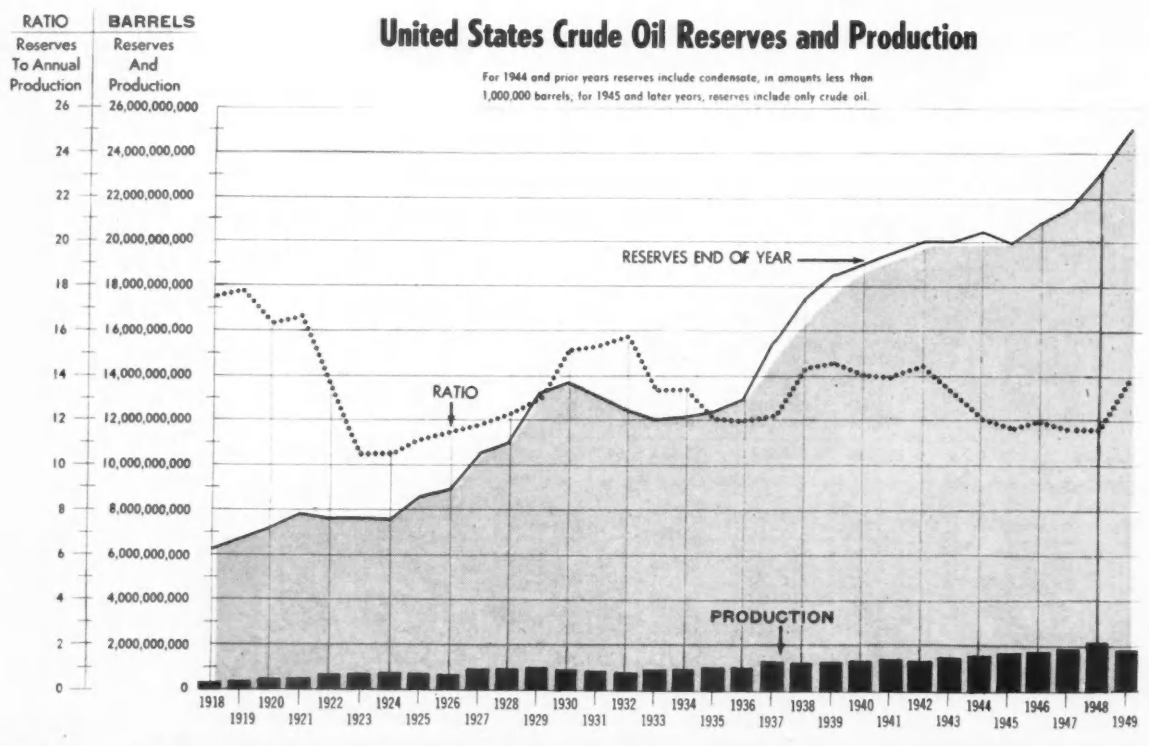
UNITED States reserves of crude oil and other liquid hydrocarbons were at a new all-time peak of 28,884,955,000 barrels at the end of 1949, it was indicated by WORLD OIL estimates of changes involved for the year. Estimated new reserves of 4,081,575,000 barrels proved up in 1949 were double the year's draft on reserves (production) of 2,017,847,000 barrels, providing a net increase of 2,063,728,000 barrels. A total of 26,821,227,000 barrels had been reported for the end of 1948 by the American Petroleum Institute and American Gas Association.

The large net addition to reserves in 1949 relieved the relatively tight situation of war-time and early postwar years, when reserves were subnormal in relation to annual production. Reserves at the end of 1949 were equivalent to 14.3 years of production at the rate that prevailed in 1949. Reserves at the end of 1948 and end of 1947 had each been equivalent to only 12.3 years of production at the rates that prevailed for those years.

U. S. reserves of crude oil only are estimated at a new peak of 25,017,910,000

United States Crude Oil Reserves and Production

For 1944 and prior years reserves include condensate, in amounts less than 1,000,000 barrels, for 1945 and later years, reserves include only crude oil.



To New High Level

barrels at the end of 1949. New reserves of 3,556,575,000 barrels estimated as proved up in 1949 were almost double the year's draft on crude reserves (crude production) of 1,819,109,000 barrels, providing a net increase of 1,737,466,000 barrels. Crude reserves of 23,280,444,000 barrels had been reported for the end of 1948 by the API. The estimated crude reserves at the end of 1949 were equivalent to 13.8 years of production at the 1949 annual rate. This ratio is about normal for peacetime, being about as in prewar years. Crude reserves at end of the year had been only 11.6 times annual production in 1948 and 1947, 12.1 times in 1946, 11.6 times in 1945. The present ratio of reserves, nearly 14 times annual production, is the most abundant situation on crude reserves since the early years of the war. The crude reserves similarly were equivalent to around 14 years of production in 1938, 1939, 1940, 1941, and 1942.

U. S. reserves of natural gas liquids at the end of 1949 are estimated at 3,867,045,000 barrels, based on 525 million barrels proved up and 198,738,000 produced during 1949, a net addition of 326,262,000 barrels to the 3,540,783,000 barrels of reserves at end of 1948 as reported by API and AGA. These reserves include condensate, natural gasoline, and liquefied petroleum gases. The estimated reserves at end of 1949 were equivalent to 19.5 years of production at the 1949 annual rate. These reserves at end of 1948 were 19.3 times annual production and at end of 1947 they were 20.2 times yearly production.

The results in 1949 in proving up 4,081,575,000 barrels of new oil reserves (3,556,575,000 crude and 525 million natural gas liquids) almost equaled the all-time record of 4,265,765,000 barrels (3,795,207,000 crude and 470,557,000 natural gas liquids) proved up in 1948. The only other year in history which closely approached the 1948 record was 1937, when 3,721,532,000 barrels of new reserves of crude oil and condensate were proved up.

The success in oil-proving in 1949 reflected the continuance of exceptionally active wildcatting and field development throughout the country and remarkably good results in some areas, as in the development of the large new reef reserves in Scurry County, West Texas.

(See Table on Page 138)

Estimated Proved Reserves of Crude Oil, Natural Gas Liquids, and Total Liquid Hydrocarbons in the United States, by States

(Sources: Crude oil by American Petroleum Institute; natural gas liquids and total liquid hydrocarbons by API and American Gas Association.)

(BARRELS OF 42 U. S. GALLONS)

	Proved Reserves as of December 31, 1947 (1)	Changes in Proved Reserves Due to Extensions (New Oil) and Revisions During 1948 (2)	[1]Proved Reserves Discovered in New Fields and in New Pools in Old Fields in 1948 (3)	[2]Production During 1948 (4)	Proved Reserves as of December 31, 1948 (Columns 1+2+3 Less Column 4) (5)	Changes in Reserves During 1948 (Column 5 Less Column 1) (6)
Crude Oil—						
Alabama	2,759,000	1,264,000		476,000	3,547,000	788,000
Arkansas	296,908,000	29,990,000	3,247,000	30,103,000	300,042,000	3,134,000
California	3,294,963,000	750,614,000	58,075,000	340,069,000	3,763,583,000	468,620,000
Colorado	381,882,000	255,000	350,000	17,029,000	365,458,000	(—) 16,424,000
Illinois	355,361,000	91,748,000	9,103,000	62,847,000	393,365,000	38,004,000
Indiana	46,015,000	5,892,000	5,129,000	7,957,000	49,079,000	3,064,000
Kansas	562,678,000	199,878,000	19,922,000	108,083,000	674,395,000	111,717,000
Kentucky	64,550,000	1,988,000	1,305,000	8,634,000	59,209,000	(—) 5,341,000
Louisiana	1,791,004,000	201,728,000	51,361,000	174,803,000	1,869,290,000	78,286,000
Michigan	69,714,000	9,894,000	6,667,000	16,892,000	69,383,000	(—) 331,000
Mississippi	303,677,000	91,962,000	13,434,000	43,627,000	365,446,000	61,769,000
Montana	114,662,000	12,258,000	1,550,000	9,526,000	118,944,000	4,282,000
Nebraska	866,000	235,000		236,000	865,000	(—) 1,000
New Mexico	530,483,000	61,017,000	8,083,000	47,352,000	552,231,000	21,748,000
New York	71,519,000			4,403,000	67,116,000	(—) 4,403,000
Ohio	28,994,000	3,454,000		3,906,000	28,542,000	(—) 452,00
Oklahoma	952,990,000	412,886,000	39,746,000	155,221,000	1,250,401,000	297,411,000
Pennsylvania	122,720,000			12,914,000	109,806,000	(—) 12,914,000
Texas	11,777,537,000	1,450,188,000	155,804,000	899,311,000	12,484,218,000	706,681,000
West Virginia	36,092,000	3,200,000	100,000	2,695,000	36,697,000	605,000
Wyoming	679,211,000	70,656,000	21,780,000	55,960,000	715,787,000	36,476,000
[3]Miscel.	3,000,000	(—) 381,000	825,000	404,000	3,040,000	40,000
Total U.S.	21,487,685,000	[4]3,398,726,000	396,481,000	2,002,448,000	23,280,444,000	1,792,759,000
[5]Natural Gas Liquids—						
[6]Alabama						
Arkansas	58,259,000	3,220,000	249,000	4,271,000	57,457,000	(—) 802,000
California	312,151,000	20,088,000	2,149,000	26,480,000	307,908,000	(—) 4,243,000
Colorado	7,942,000	27,834,000	537,000	14,000	36,299,000	28,357,000
Illinois	17,920,000	10,152,000		3,910,000	24,162,000	6,242,000
Indiana	65,000	71,000		28,000	108,000	43,000
Kansas	88,812,000	15,621,000	17,000	2,106,000	102,344,000	13,532,000
Kentucky	15,344,000	410,000	206,000	1,559,000	14,401,000	(—) 943,000
Louisiana	462,814,000	67,206,000	16,113,000	22,037,000	524,096,000	61,282,000
Michigan	1,065,000	53,000	59,000	111,000	1,066,000	1,000
Mississippi	58,659,000	721,000	942,000	2,758,000	57,564,000	(—) 1,095,000
Montana	1,360,000	2,840,000		200,000	4,000,000	2,640,000
New Mexico	85,922,000	(—) 5,756,000	4,342,000	4,261,000	80,247,000	(—) 5,675,000
[6]New York						
Ohio	1,736,000	70,000	9,000	151,000	1,664,000	(—) 72,000
Oklahoma	155,003,000	53,685,000	8,225,000	16,525,000	200,388,000	45,385,000
Pennsylvania	2,236,000	467,000	233,000	291,000	2,645,000	409,000
Texas	1,957,063,000	180,126,000	31,204,000	93,719,000	2,074,674,000	117,611,000
West Virginia	17,521,000	1,076,000	359,000	3,742,000	15,214,000	(—) 2,307,000
Wyoming	9,900,000	27,971,000		1,564,000	36,307,000	26,407,000
[7]Miscel.	203,000	19,000	39,000	22,000	239,000	36,000
Total U.S.	3,253,975,000	405,874,000	64,683,000	183,749,000	3,540,783,000	286,808,000
LiquidHydrocarbons—						
[8]Alabama	2,759,000	1,264,000		476,000	3,547,000	788,000
Arkansas	355,167,000	33,210,000	3,496,000	34,374,000	357,499,000	2,332,000
California	3,607,114,000	770,702,000	60,224,000	366,549,000	4,071,491,000	464,377,000
Colorado	389,824,000	28,089,000	887,000	17,043,000	401,757,000	11,933,000
Illinois	373,281,000	101,900,000	9,103,000	66,757,000	417,527,000	44,246,000
Indiana	46,080,000	5,963,000	5,129,000	7,985,000	49,187,000	3,107,000
Kansas	651,490,000	215,499,000	19,939,000	110,189,000	776,739,000	125,249,000
Kentucky	79,894,000	2,398,000	1,511,000	10,193,000	73,610,000	(—) 6,284,000
Louisiana	2,253,818,000	268,934,000	67,474,000	196,840,000	2,393,386,000	139,568,000
Michigan	70,779,000	9,947,000	6,726,000	17,003,000	70,449,000	(—) 330,000
Mississippi	362,336,000	92,683,000	14,376,000	46,385,000	423,010,000	60,674,000
Montana	116,022,000	15,098,000	1,550,000	9,726,000	122,944,000	6,922,000
Nebraska	866,000	235,000		236,000	865,000	(—) 1,000
New Mexico	616,405,000	55,261,000	12,425,000	51,613,000	632,478,000	16,073,000
[8]New York	71,519,000			4,403,000	67,116,000	(—) 4,403,000
Ohio	30,730,000	3,524,000	9,000	4,057,000	30,206,000	(—) 524,000
Oklahoma	1,107,993,000	466,571,000	47,971,000	171,746,000	1,450,789,000	342,796,000
Pennsylvania	124,956,000	467,000	233,000	13,205,000	112,451,000	(—) 12,505,000
Texas	13,734,600,000	1,630,314,000	187,008,000	993,030,000	14,558,892,000	824,292,000
West Virginia	53,613,000	4,276,000	459,000	6,437,000	51,911,000	(—) 1,702,000
Wyoming	689,211,000	98,627,000	21,780,000	57,524,000	752,094,000	62,883,000
[9]Miscel.	3,203,000	(—) 362,000	864,000	426,000	3,279,000	76,000
Total U.S.	24,741,660,000	3,804,600,000	461,164,000	2,186,197,000	26,821,227,000	2,079,567,000

[1] Only a limited area is assigned to each new discovery, even though the committee may believe that eventually a much larger area will produce; for in this report the concern is only with actually proved reserves.

[2] The 1948 production figures were compiled by the committee and are based on 11 months actual production with an estimate for December. Any variance between the actual production, as later reported, and the figures used herein will be compensated for through revision when the following year's reserve report is compiled. These revisions have in the past been very small.

[3] Includes Florida, Missouri, Tennessee, Utah, and Virginia.

[4] Includes 1,439,873,000 bbls. of extensions to old pools and upward revision of 1,958,853,000 bbls. in previous estimates.

[5] Condensate, natural gasoline, and liquefied petroleum gases.

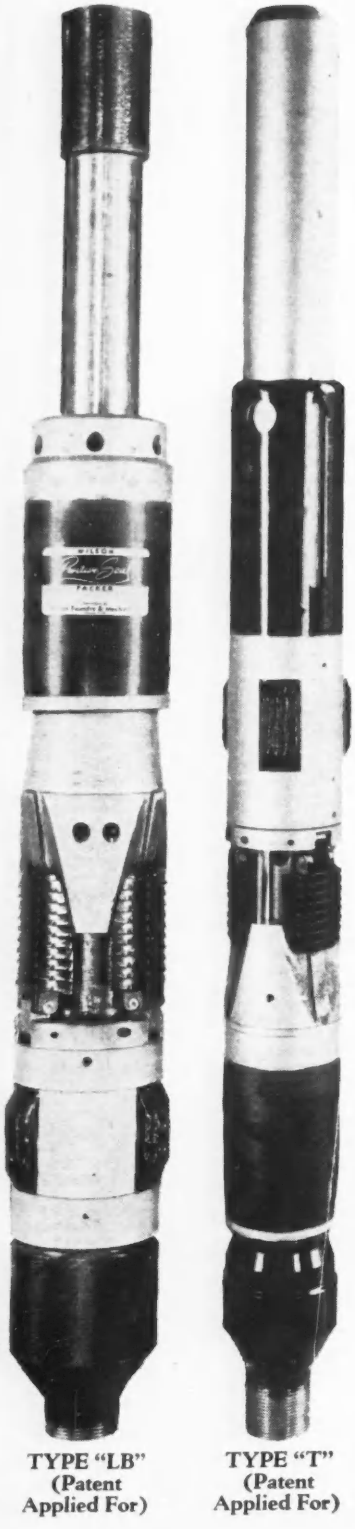
[6] Included below with Miscellaneous.

[7] Includes Alabama, Florida, New York, and Utah.

[8] Crude oil only; natural gas liquids not separable from miscellaneous grouping in data on natural gas liquids.

[9] Includes Alabama and New York natura gas liquids; Missouri, Tennessee, and Virginia crude; Florida and Utah crude and natural gas liquids.

YES . . . . There is a WILSON to MEET EVERY



TYPE "LB" (Patent Applied For)

TYPE "T" (Patent Applied For)

In the belief that no "one Packer" can successfully meet all the varying conditions of the Oil Producing Industry — the Wilson Foundry & Machine Company has developed two "Special" Hook-Wall Packers to go with their standard type "LB" Packer. These two Packers are the type "MB," "Metal Block" Packer, and the type "T" "Upside Down" Packer.

The WILSON Type "LB" "Positive Seal" Hook-Wall Packer

—fool proof in setting

This packer assures a "Positive Seal" regardless of where the differential occurs, above the element or below the element. If the differential is above, the rubber element is pressed against the seat, assuring a tight seal-off. If the differential is below, the patented split pack-off of the rubber element gives a "Lip-Seal"—the greater the pressure the tighter the seal.

In the Wilson "Positive Seal" Hook-Wall Packer, three friction blocks, hard faced with stellite are used in place of friction wiper springs. These friction blocks are held against the wall of casing by three rugged coil springs—and insure correct setting regardless of depth.

The non-vulcanizing pack-off element is expanded by conical wedge—and does not depend on excessive tubing weight on packer to secure pack-off.

Slips and slip reins are compact. Slips are set in "dove-tail" on mandrel and cannot be lost in the hole.

There is ample "by-pass" area for fluid between the tube and pack-off. When packer is set—"by-pass" is closed by pack-off sealing tube and casing. Foreign matter in fluid will not interfere with closing of "by-pass."

*This packer can be set in "mixed" strings of casing, a feature that means small inventories.

**Special Packer required on some types of Internal Upset Casing.*

At Your Supply Store

WILSON FOUNDRY

HOUSTON,

PACKER Especially Designed Condition Encountered

The WILSON Type "MB" "Metal Block" Hook-Wall Packer

—for real Deep wells

No matter how deep you are—how great your hydrostatic head is—when you set the Wilson "Metal Block," type "MB" Packer—it *holds.*

This "Metal Block" Packer is especially designed for DEEP PRODUCTION—where the hydrostatic head is greater than the bottom hole pressure. It is especially designed to prevent all cold flow of rubber between the casing and the outside diameter of the tool.

This is accomplished with six overlapping steel segments that come directly in contact with the casing right below the rubber element. This "Metal Block" of segments totally confines the rubber element between the casing, the top of the "Metal Block" and the mandrel of the Packer.

In going-in and coming-out of the hole, the "Metal Block" is retracted to the same diameter of the packer. In setting the Packer, the segments expand against the casing at the same time as the slips are set.

The WILSON Type "T" "Upside Down" Hook-Wall Packer

—sets by pulling up on Tubing

For testing casing leaks; for acidizing; for high pressure gas wells, where the bottom hole pressure is greater than the hydrostatic head—the Wilson "Upside Down" Packer has no equal.

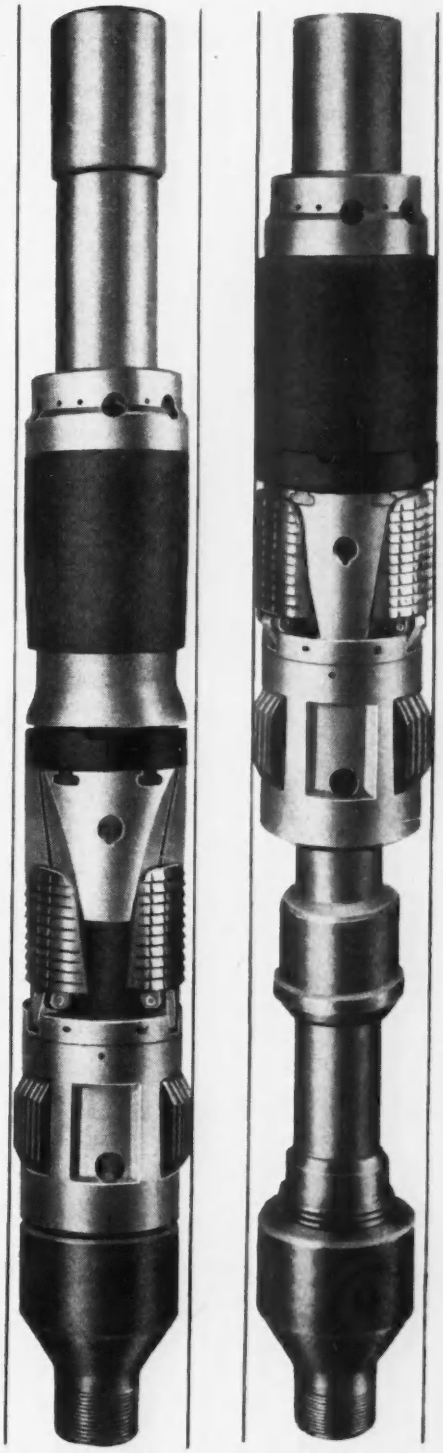
With this new Packer you can stop the "breathing" of your tubing while the pump is in motion, thus increasing the pumping capacity of your well.

Kinks in the tubing are eliminated, thus minimizing wear on rods and tubing.

This Wilson, Type "T" "Upside Down" Packer can be furnished without the rubber element, when it is desired only to anchor your tubing.

Packer is released with downward stroke, instead of an upward jerk, with a torque to the right. The downward motion automatically jars the packer loose.

At Your Supply Store



TYPE "MB" GOING IN HOLE — TYPE "MB" SET

(Patent Applied For)

& MACHINE CO.

TEXAS

Estimated Proved Reserves of Crude Oil, Natural Gas Liquids, and Total Liquid Hydrocarbons in the United States, by Years

(Sources: Crude oil by American Petroleum Institute; natural gas liquids and total liquid hydrocarbons by API and American Gas Association. Reserves at end of 1936 and for subsequent years estimated by committees on reserves; earlier data estimated by API department of statistics but not based on geological surveys.)

(THOUSANDS OF BARRELS)

YEAR	Proved Reserves Beginning of Year	NEW RESERVES PROVED DURING YEAR: Revisions of Previous Estimates	Extensions to Old Pools	Total Revisions and Extensions (Cols. 2+3)	New Pools Discovered During Year	Total Proved Reserves Added During Year (Cols. 4+5)	*Production During Year	Proved Reserves End of Year (Cols. 1+6−7)	Ratio of Reserves at End of Year to Year's Production (Years Supply)	Net Increase or Decrease in Reserves During Year (Col. 8 — Col. 1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Crude Oil (Incl. Cycle Plant and Lease Condensate)										
1857-1899	0					†3,439,984	†939,984	2,500,000	‡43.8	†+2,500,000
1900	2,500,000					463,621	63,621	2,900,000	45.6	+ 400,000
1901	2,900,000					169,389	69,389	3,000,000	43.2	+ 100,000
1902	3,000,000					288,767	88,767	3,200,000	36.0	+ 200,000
1903	3,200,000					300,461	100,461	3,400,000	33.8	+ 200,000
1904	3,400,000					317,081	117,081	3,600,000	30.7	+ 200,000
1905	3,600,000					334,717	134,717	3,800,000	28.2	+ 200,000
1906	3,800,000					126,494	126,494	3,800,000	30.0	
1907	3,800,000					266,095	166,095	3,900,000	23.5	+ 100,000
1908	3,900,000					278,527	178,527	4,000,000	22.4	+ 100,000
1909	4,000,000					383,171	183,171	4,200,000	22.9	+ 200,000
1910	4,200,000					509,557	209,557	4,500,000	21.5	+ 300,000
1911	4,500,000					720,449	220,449	5,000,000	22.7	+ 500,000
1912	5,000,000					622,935	222,935	5,400,000	23.8	+ 400,000
1913	5,400,000					348,446	248,446	5,500,000	22.1	+ 100,000
1914	5,500,000					165,763	265,763	5,400,000	19.9	— 100,000
1915	5,400,000					381,104	281,104	5,500,000	19.6	+ 100,000
1916	5,500,000					700,767	300,767	5,900,000	19.6	+ 400,000
1917	5,900,000					335,316	335,316	5,900,000	17.6	
1918	5,900,000					655,928	355,928	6,200,000	17.4	+ 300,000
1919	6,200,000					878,367	378,367	6,700,000	17.7	+ 500,000
1920	6,700,000					942,929	442,929	7,200,000	16.3	+ 500,000
1921	7,200,000					1,072,183	472,183	7,800,000	16.5	+ 600,000
1922	7,800,000					357,531	557,531	7,600,000	13.6	— 200,000
1923	7,600,000					732,407	732,407	7,600,000	10.4	
1924	7,600,000					613,940	713,940	7,500,000	10.5	— 100,000
1925	7,500,000					1,763,743	763,743	8,500,000	11.1	+1,000,000
1926	8,500,000					1,070,874	770,874	8,800,000	11.4	+ 300,000
1927	8,800,000					2,601,129	901,129	10,500,000	11.7	+1,700,000
1928	10,500,000					1,401,474	901,474	11,000,000	12.2	+ 500,000
1929	11,000,000					3,207,323	1,007,323	13,200,000	13.1	+2,200,000
1930	13,200,000					1,298,011	898,011	13,600,000	15.1	+ 400,000
1931	13,600,000					251,081	851,081	13,000,000	15.3	— 600,000
1932	13,000,000					85,159	785,159	12,300,000	15.7	— 700,000
1933	12,300,000					605,656	905,656	12,000,000	13.3	— 300,000
1934	12,000,000					1,085,065	908,065	12,177,000	13.4	+ 177,000
1935	12,177,000					1,219,596	996,596	12,400,000	12.4	+ 233,000
1936	12,400,000					1,763,087	1,099,687	13,063,400	11.9	+ 663,400
1937	13,063,400			2,792,790	928,742	3,721,532	1,277,664	15,507,268	12.1	+2,443,868
1938	15,507,268			2,243,571	810,493	3,054,064	1,213,186	17,348,146	14.3	+1,840,878
1939	17,348,146			2,058,455	340,667	2,399,122	1,264,256	18,483,012	14.6	+1,134,866
1940	18,483,012			1,607,012	286,338	1,893,350	1,351,847	19,024,515	14.1	+ 541,503
1941	19,024,515			1,538,989	429,974	1,968,963	1,404,182	19,589,296	13.9	+ 564,781
1942	19,589,296			1,618,925	260,051	1,878,976	1,385,479	20,082,793	14.5	+ 493,497
1943	20,082,793			1,202,368	282,418	1,484,786	1,503,427	20,064,152	13.3	— 18,641
1944	20,064,152			1,556,192	511,308	2,067,500	1,678,421	20,453,231	12.2	+ 389,079
1945	20,453,231	248,891	1,441,424	1,690,315	419,984	2,110,299	1,736,717	20,826,813	12.0	+ 373,582
Crude Oil Only										
1945	19,784,530					1,870,971	1,713,655	19,941,846	11.6	+ 157,316
1946	19,941,846	+1,254,705	1,158,923	2,413,628	244,434	2,658,062	1,726,348	20,873,560	12.1	+ 931,714
1947	20,873,560	+ 749,278	1,269,862	2,019,140	445,430	2,464,570	1,850,445	21,487,685	11.6	+ 614,125
1948	21,487,685	+1,958,853	1,439,873	3,398,726	396,481	3,795,207	2,002,448	23,280,444	11.6	+1,792,759
atural Gas Liquids (Condensate, Natural Gasoline, Liquefied Petroleum Gases)										
1946								3,163,219		
1947	3,163,219			192,237	59,301	251,538	160,782	3,253,975	20.2	+ 90,756
1948	3,253,975			405,874	64,683	470,557	183,749	3,540,783	19.3	+ 286,808
Total Liquid Hydrocarbons										
1946								24,036,779		
1947	24,036,779			2,211,377	504,731	2,716,108	2,011,227	24,741,660	12.3	+ 704,881
1948	24,741,660			3,804,600	461,164	4,265,764	2,186,197	26,821,227	12.3	+2,079,567

* Production for 1936 and previous years from U.S. Bureau of Mines; production for 1937 and each subsequent year compiled by API (and AGA) committees on basis of 11 months actual and December estimated. Small variance of these figures from actual production as later reported is compensated by revision when reserves report for succeeding year is compiled.

† During years 1857-1899.

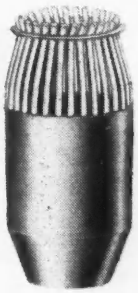
‡ Based on production of 57,071 thousand barrels in 1899.

Clean as a Whistle

with the famous GUIBERSON "L" cup on the versatile "K" tubing swab

THE 'L' IS RIGHT FOR THE JOB....

when you want to lift light and medium fluid loads from great depths —and get every drop out of the tubing. "L" cups are made specifically to go down and get that last bit of fluid—and to resist chemical and abrasive wear through many, many fast-falling drops and tight-sealing lifts.



LOOK TO THE "J" CUP....

when you're unloading a deep, wet well with a heavy fluid column. The "J" will bring out the heaviest column that can be safely handled—and, like the "L," it is fast-dropping going in and tight-sealing coming out.

FOR AN ALL PURPOSE CUP

the "K" is the answer. Combining surprising flexibility with great durability, this free-dropping general duty cup is normally recommended for swabbing to 6,000 feet.

Start with the Guiberson "K" swab . . . choose from these three Guiberson-developed cups . . . and you can effectively and economically swab ANY well in the least number of trips.

INTERCHANGEABLE

QUICK-DRESSING

SPRING STEEL REINFORCED

Write for—or ask your Guiberson representative for—the new booklet on all Guiberson tubing swabs.

SOLD BY LEADING OIL FIELD SUPPLY STORES EVERYWHERE

Established 1919

THE GUIBERSON CORPORATION

Dallas, Texas U.S.A.

California Holds

PRODUCING DEPTH RECORD

By 20-Foot Margin

THE world's deepest oil and gas producing depth advanced to another record in 1949, which marked the seventh consecutive year in which the mark has been extended. As operators continued to search deeper for additional sources of oil and gas, new production depth marks also were established in several states and districts.

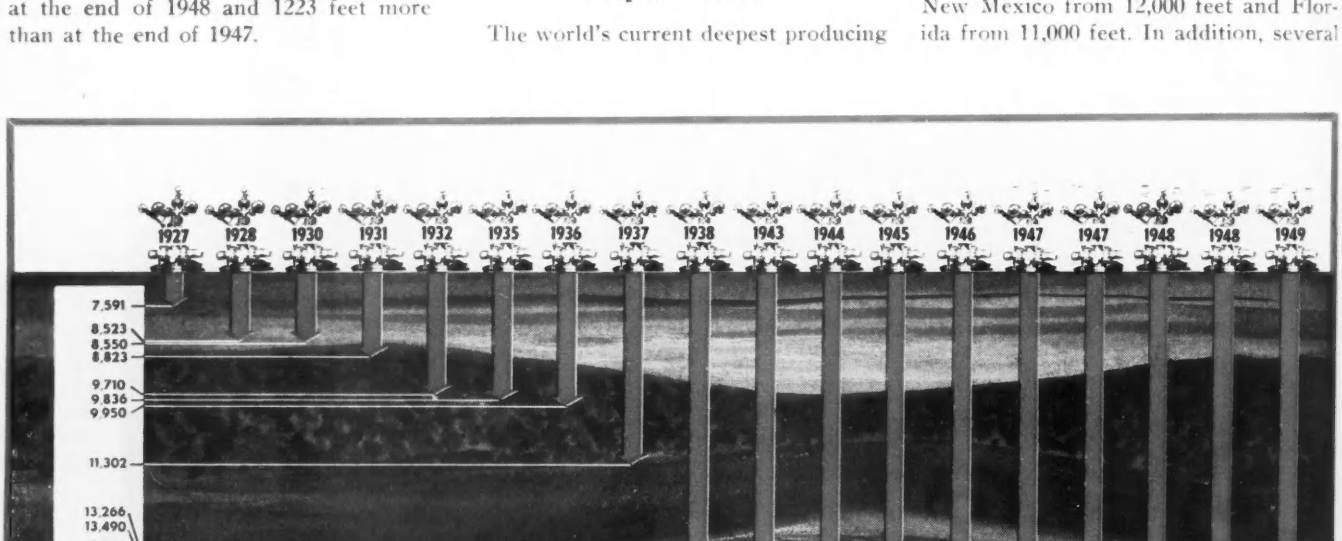
The depth record was increased to 15,530 feet last year, 20 feet deeper than at the end of 1948 and 1223 feet more than at the end of 1947.

For the first time since 1937, California is the site of the present deepest producing well. From 1938 through 1947, Southern Louisiana held a monopoly on the title of deepest producing area. During this period the record progressed from 13,266 to 13,904 feet, but the record-breaking wells were all located in South Louisiana. In 1948, Oklahoma took over the honor with a well producing gas from 15,510 feet.

Deepest Producer

The world's current deepest producing well is Standard Oil Company of California's Mushrush 5, Wasco field, Kern County, California. It succeeds Denver Producing & Refining Company's School Land 1-A, Caddo County, Oklahoma.

Six states now have production from below 13,000 feet. California and Oklahoma are the only states producing from 15,000 feet. South Louisiana and Wyoming produce from 14,000 feet, Texas and Mississippi from 13,000 feet. Two other states produce from below 10,000 feet; New Mexico from 12,000 feet and Florida from 11,000 feet. In addition, several



Year	WELL AND LOCATION	Feet
1927	E. J. Miley's Athens 6, Rosecrans field, California	7,591
1928	Texon Oil and Land Company's University 1-B, Big Lake field, West Texas	8,523
1930	Star Petroleum Company's Colby 2, Long Beach, California	8,550
1931	Tide Water Associated Oil Company's Lloyd 57, Ventura Avenue, California	8,823
1932	Tide Water Associated Oil Company's Lloyd 83, Ventura Avenue, California	9,710
1935	Tide Water Associated Oil Company's Lloyd 131, Ventura Avenue, California	9,836
1936	The Texas Company's Lafitte 5, Lafitte field, Southern Louisiana	9,950
1937	Union Oil Company's Kerneo 1-34, Rio Bravo field, Kern County, California	11,302
1938	Fohs Oil Company's Buckley-Bourg 1, DeLarge field, Southern Louisiana	13,266
1943	Union Producing Company's Fitzpatrick-Vizard 1, DeLarge field, Southern Louisiana	13,490
1944	Union Producing Company-Fohs Oil Company's Buckley-Bourg 2, DeLarge field, Southern Louisiana	13,503
1945	Shell Oil Company's Smith-State 1, Weeks Island field, Southern Louisiana	13,520
1946	Shell Oil Company's Smith-State 2, Weeks Island field, Southern Louisiana	13,778
1947	Shell Oil Company's Smith-State 3, Weeks Island field, Southern Louisiana	13,888
1947	The Texas Company's LaFourche Basin Levee District 1, Queen Bess Island field, Southern Louisiana	13,904
1948	Pure Oil Company's Unit 1, West Poison Spider field, Wyoming	14,307
1948	Denver Producing and Refining Company's School Land 1-A, Cogar field, Caddo County, Oklahoma	15,510
1949	Standard Oil Company of California's Mushrush 5, Wasco field, Kern County, California	15,530

of the districts in Texas have production from below 10,000 feet.

The producing depth first reached 8000 feet in 1928, and four years passed before the 9000-foot level was surpassed. First production from below 10,000 feet was found in 1937, with completion of a 11,302-foot producer.

The following year saw the record extended to 13,266 feet, and the mark remained less than 14,000 feet until completion in 1948 of the 15,510-foot producing well in Oklahoma.

Records Recent

A compliment to the manufacturers of increasingly better equipment, and likewise indicative of the need for going steadily deeper to find oil is the fact that only one oil-producing region in the U. S. set its current producing depth record prior to the decade just past. Oldest regional record on the books is Eastern Kentucky's 5170 mark, set in 1932. Of the other 37 oil-producing areas, only two have records which have stood since 1940.

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These are Missouri, which continues to hold the shallowest producing depth mark —1440 feet—of any state, and North Central Texas, where the deepest well was a 6065-footer.

Seventeen of the now-standing producing depth marks were made in the last two years, and ten of them were set in 1949, making it the busiest year on record in this respect.

Other than California, present home of the world's deepest well, regions which bested their old marks in the past year were Maryland, Nebraska, Montana, Texas Panhandle, Utah, Southwest Texas, West Texas, South Louisiana and New Mexico.

1948 Marks

Regions with records established in 1948 are Tennessee, Western Kentucky, North Louisiana, Florida, Upper Texas Coast, Wyoming and Oklahoma.

Twenty-five of the deepest producers in the 38 regions are oil wells. Nine are gas producers and four yield condensate.

The 18 record producers since 1927 have now been drilled by an even dozen companies. Tide Water Associated Oil Company and Shell Oil Company have each held the record three times, while The Texas Company and Union Producing Company have each held it twice.

Producing Depth Records in U. S. by States and Districts

State or District	Feet	Year	Formation	Well, Location and Remarks
California	15,530	1949	Eocene	Standard Oil Company of California's Mushrush 5, Wasco field. Kern County. (Oil) World's deepest.
Oklahoma	15,510	1948	Viola	Denver Producing & Refining Company's School Land 1-A, Cogar field. Caddo County (Gas).
South Louisiana	14,467	1949	.....	Humble Oil & Refining Co.'s State Lse. 1452-1, Lake Raccourci field, Laforuche Parish, (Condensate).
Wyoming	14,307	1948	2nd Frontier	Pure Oil Company's Unit 1, West Poison Spider field, Natrona County. (Oil)
West Texas	13,130	1949	Ellenburger	The Texas Co.'s Clarence Scharbauer et al 1, Warfield Ellenburger field, Midland County. (Oil)
Mississippi	13,082	1947	Glen Rose	Gulf Refining Company's L. L. Majors 1, West Ovett field, Jones County. (Oil)
New Mexico—S.E.	12,600	1949	Devonian	Amerada Petroleum Corp.'s Hamilton 1, Knowles field. Lea County. (Oil)
Upper Texas Coast	12,026	1948	Lower Frio	Humble O&R Co.'s Southmayes Unit 1, South Mayes field, Chambers County. (Condensate)
Florida	11,588	1948	L. Cretaceous	Humble O&R Co.'s Lee Tidewater Cypress Lumber Co. 1-B, Suniland field, Collier County. (Oil)
Lower Texas Coast	11,192	1945	Wilcox	Sun Oil Company's R. A. Thompson 1, West Goliad field, Goliad County. (Oil)
North Louisiana	10,789	1948	Smackover	T. L. James & Co. et al's Williamson Lewis 2, Haynesville-Deep field, Claiborne Parish. (Oil)
East Texas	10,312	1942	Pettit	Humble O&R Company's Curtis 1, Larissa field, Cherokee County. (Oil)
Southwest Texas	9,984	1949	.....	Quintana Pet. Corp.'s J. H. Harvey 1, Un-named field, San Patricio County. (Gas)
Utah	9,392	1949	Basal Tertiary	Carter Oil Co.-Stanolind O&G Co.'s Ute-Tribal 1, Roosevelt field, Uintah County. (Oil)
Arkansas	9,320	1944	Smackover	Tide Water Associated Oil-Seaboard Oil Company's Bendaw 1, Patton field, Lafayette County. (Oil)
South Central Texas	9,018	1946	Edwards	Quintana Petroleum Corporation's C. Muil 3, Muil field, Atascosa County. (Oil)
Texas Panhandle	8,970	1949	Mississippian	Sinclair Oil & Gas Company's C. S. Lips 1, 135-C-G&M Sur, Roberts County. (Oil)
North Texas	8,940	1946	Ellenburger	Standard Oil of Texas' I. Beasely 2, Sivels Bend field, Cooke County. (Oil)
New Mexico—N.W.	8,875	1945	Paradox	Southern Union Gas Co.'s Barker-Ute Indian 11, Barker Creek field, San Juan County. (Gas)
West Virginia	8,410	1946	Oriskany	Ohio Oil Company's Kuykendall et al 1, Dry Fork District, Tucker County. (Gas)
Pennsylvania	8,020	1946	Oriskany	American Locomotive Company's L. C. Steiner 5, Unity Township, Westmoreland County. (Gas)
East Texas Border	7,586	1946	Travis Peak	Magnolia Petroleum Company's S. L. Orr 1, Lassater field, Marion County. (Oil)
Montana	7,560	1949	Dakota	British American Oil Prod. Co.'s McClellan-Gov't. 1, Clark's Fork field, Carbon County. (Condensate)
Colorado	7,198	1941	Morrison	Texas Company-California Company's Unit 10, Wilson Creek field, Rio Blanco County. (Oil)
Kansas	6,200	1947	Cherokee	Stanolind Oil & Gas Company's Feather 1, Liberal, SE. field, Seward County (Condensate)
North Central Texas	6,065	1940	Mississippian	J. D. Sandefer Jr., et al's T. K. Smith 1, Aspermont field, Stonewall County. (Oil)
Ohio	5,839	1946	Clinton	Frank Lyons' Anita B. Wright 1, Hanover Township, Columbiana County. (Gas)
New York	5,229	1942	Oriskany	E. Kent Kane's Robert Lewis 1, West Union Township, Steuben County. (Gas)
Eastern Kentucky	5,170	1932	Devonian	United Carbon Company's Howe 1, Pike County. (Gas)
Michigan	5,064	1946	Richfield	Pure Oil Company's Freer 1, Orient field, Clare County. (Oil)
Illinois	4,780	1943	Trenton	Kingwood Oil Company's Shanafelt 24-A, Salem field, Marion County. (Oil)
Nebraska	4,554	1949	Third Dakota	Ohio Oil Company's W. T. Knievel 3, Gurley field, Cheyenne County. (Oil)
Maryland	4,456	1949	Huntersville	Cumberland & Allegheny Gas Company's Elmer N. Beachy S-424, Garrett County. (Gas)
Alabama	3,624	1945	Eutaw	Hunt Oil Company's Robert Land 4, Gilbertown field, Choctaw County. (Oil)
Western Kentucky	3,047	1948	McClosky	Ashland Oil & Refining & F. T. Shelton's Mattie Ramsey 1, Dixon field, Webster County. (Oil)
Indiana	3,011	1946	McClosky	H. E. Ledbetter et al's Noble Utley 1, Springfield Consolidated field, Posey County. (Oil)
Tennessee	1,790	1948	Knox	Turner Bros. & Shaner's Fred Johnson 1, Forbus field, Fentress County. (Oil)
Missouri	1,444	1940	Bartlesville	Cities Service Oil Company's Jim Cook 1, Tarkio field, Atchison County. (Oil)

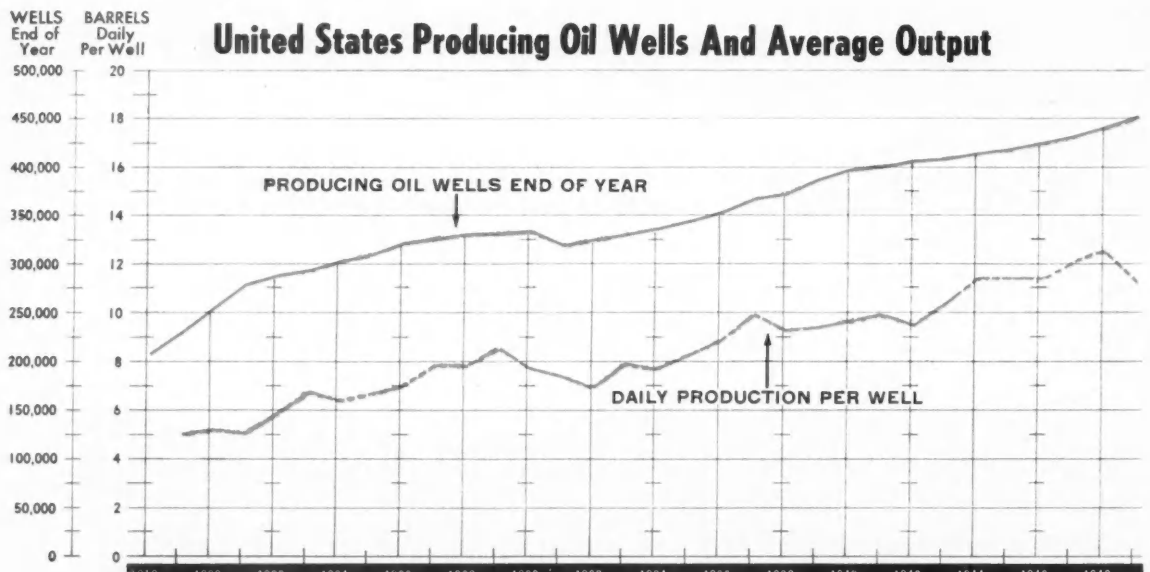
9937

Added in 1949

THE number of oil and distillate producing wells in the U. S. continued to grow to new all-time peaks during the past year. Another large increase boosted the number of wells producing either oil or condensate to 452,009 by the close of 1949, an increase of 10,405 over the end of 1948.

Most of these wells were oil producers, of which there were 449,545, a gain of 9937 during the 12 months. This rate of increase compared with a 11,086 gain in oil wells during 1948, but 1949 still ranked above normal annual growth. The increase in number of active producing oil wells, coupled with the substantial curtailment of crude production, resulted in a sharp decline in average daily production per well. Whereas output in 1948 was at an all-time high of 12.4 barrels per day per well, an average of only 11.1 barrels per well per day were produced during 1949. This daily average yield per well was the lowest since 1944, but above prewar levels.

With prospects that drilling activity in 1950 again will be at high levels, although slightly under 1949 rates, another large gain in the number of producing oil wells appears likely this year unless reductions in prices or tax allowances cause an unusually high rate of abandonment. Since U. S. crude production in 1950 is expected to be but little higher than in 1949, the prospec-



YEAR	Number of Producing Oil Wells At End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year
1918	203,375	.....	17,860	....
1919	227,000	23,625	21,041	4.8
1920	251,000	24,000	24,278	5.0
1921	274,500	23,500	14,715	4.9
1922	284,880	10,380	17,790	5.7
1923	290,100	5,220	16,182	6.6
1924	299,100	9,000	14,707	6.2
1925	306,100	7,000	17,029	6.5
1926	318,600	12,500	18,626	6.8
1927	323,300	4,700	14,382	7.7
1928	327,800	4,500	12,348	7.6
1929	328,200	400	15,362	8.4
1930	331,070	2,870	11,693	7.5
1931	315,850	*15,220	7,011	7.2
1932	321,500	5,650	10,530	6.7
1933	326,850	5,350	8,070	7.7
1934	333,070	6,220	13,119	7.5
1935	340,990	7,920	15,418	8.1
1936	349,450	8,460	18,704	8.7
1937	363,030	13,580	23,115	9.8
1938	369,640	6,610	19,106	9.1
1939	380,390	10,750	17,734	9.2
1940	389,010	8,620	19,843	9.6
1941	399,960	10,950	19,590	9.7
1942	404,840	4,880	10,977	9.4
1943	407,170	2,330	9,887	10.2
1944	412,220	5,050	13,502	11.2
1945	415,750	3,530	13,944	11.3
1946	421,460	5,710	16,087	11.3
1947	426,280	4,820	17,613	12.0
1948	439,608	11,086	22,197	12.4
1949	449,545	9,937	21,352	11.1

* Only decrease of recent time, reflecting abandonment or shutting in of many wells when early chaotic development of East Texas field, coupled with business depression, severely depressed crude prices.

SOURCE: Producing well data for 1918-1947 from U. S. Bureau of Mines, with more recent years by WORLD OIL with cooperation of state conservation officials and others. Completion data since 1920 from records of WORLD OIL (and predecessor, The Oil Weekly), earlier years from Bureau of Mines Daily average production per well obtained by dividing daily average production of nation for years by average number of wells producing during year, that is, between January 1 and December 31.

tive increase in producing wells indicates average output per well will be reduced somewhat further. Daily average production per well already had declined to 11 barrels by the end of last year, in contrast with 11.1 barrels for the whole year.

New oil wells completed through drilling operations during the year totaled 21,352, which was the second largest number in history and was the chief contributing factor to the sharp growth in number of producing wells. An increase of only 9937 in total producing oil wells when 21,352 new wells were completed during the year indicates that 11,415 former producing wells were either abandoned or shut in.

Most of the nation's producing oil wells continued to obtain their output through means of artificial lift. Only 11.4 percent of the wells were flowing at year's end. Of the 449,545 oil wells at the end of 1949, there were 398,291 on artificial lift (pumping or air-gas lift), and only 51,254 were flowing. Thus, of the 9937 gain in producing oil wells during the year, artificial lift wells accounted for 8719 of the growth while flowing wells were responsible for only 1218.

Texas had the largest number of producing oil wells, with 114,767, or one-fourth of all wells in the nation. This state accounted for most of the gain in producing oil wells during the year, contributing 5124 of the 9937 gain for the country as a whole. Texas also had more than one-half of the condensate wells, and 76 percent of the flowing wells in the nation.

The second largest number of producers was located in Pennsylvania, which had 83,700 wells. Oklahoma followed with 54,360 producing wells. Illinois with 31,240 and Kansas with 29,095 were the only other states to have more than 25,000 producing wells although California was just under that mark with 24,567 wells, of which 67 were condensate producers. The latter state experienced a sharp decrease, dropping from 26,611 producing wells at the end of 1948 as a result of many wells being shut in because of an excessive supply condition.

At the end of 1949 Utah had the best per well producing rate of any state, yielding 131.8 barrels per day per well from 22 wells. Next to Utah came Colorado with a year-end average of 82.8 barrels daily from each of its 749 producing wells. Florida was close behind with 81.8 barrels per day from each of its 11 wells. Mississippi, which had been at the top in average yield per well, dropped from 94.9 barrels to 67.6 barrels per well per day.

Among the states with more than 10,000 producing wells, Louisiana was the leader. This state was producing 51.8 barrels per well at the end of the year, a decrease of five barrels per well per day from its average at the close of 1948.

Active Producing Crude Oil and Condensate Wells in U. S., Methods of Producing, and Average Output per Well, by States and Districts, at End of 1949 and 1948

Data represent only active crude oil and condensate producing wells, including no inactive or shut-in wells and no gas wells. Compiled by WORLD OIL, with cooperation of state conservation departments and other sources.

STATE or DISTRICT	CONDENSATE WELLS						CRUDE OIL WELLS									TOTAL CRUDE OIL AND CONDENSATE WELLS			
	End of 1948			End of 1949			Flowing		Artificial Lift		TOTAL CRUDE OIL WELLS								
											End of 1948			End of 1949			End of 1948		End of 1949	
		Bbls. Daily Production			Bbls. Daily Production							Bbls. Daily Production			Bbls. Daily Production			Bbls. Day Prod. Per Well		Bbls. Day Prod. Per Well
	Wells	Total	Per Well	Wells	Total	Per Well	End of 1948	End of 1949	End of 1948	End of 1949	Wells	Total	Per Well	Wells	Total	Per Well	Wells		Wells	
Alabama									33	39	33	1,200	36.4	39	1,500	38.5	33	36.4	39	38.5
Arkansas	138	4,600	33.3	125	4,200	33.6	340	291	3,040	3,076	3,380	82,100	24.3	3,367	74,500	22.1	3,518	24.6	3,492	22.5
California	62	2,450	39.5	67	2,950	44.0	2,136	2,373	24,413	22,127	26,549	947,150	35.7	24,500	865,850	35.3	26,611	35.7	24,567	35.4
San Joaquin Valley	62	2,450	39.5	67	2,950	44.0	1,170	1,339	13,295	11,054	14,465	429,800	29.7	12,393	379,850	30.7	14,527	29.8	12,460	30.7
Coastal District							510	576	2,644	2,705	3,154	176,400	55.9	3,281	178,800	54.5	3,154	55.9	3,281	54.5
Los Angeles Basin							456	458	8,474	8,368	8,930	340,950	38.2	8,826	307,200	34.8	8,930	38.2	8,826	34.8
Colorado							113	87	611	662	724	42,700	59.0	749	62,000	82.8	724	59.0	749	82.8
Florida							5	5	3	6	8	800	100.0	11	900	81.8	8	100.0	11	81.8
Illinois							58	71	30,261	31,169	30,319	177,700	5.9	31,240	178,800	5.7	30,319	5.9	31,240	5.7
Indiana							18	35	3,252	3,739	3,270	22,500	6.9	3,774	28,200	7.5	3,270	6.9	3,774	7.5
Kansas							143	62	24,975	29,033	25,118	314,400	12.5	29,095	284,200	9.8	25,118	12.5	29,095	9.8
Kentucky									14,554	14,895	14,554	23,300	1.6	14,895	25,300	1.7	14,554	1.6	14,895	1.7
Louisiana	366	16,500	45.1	769	22,100	28.7	3,367	3,320	5,508	6,689	8,875	504,300	56.4	10,009	536,400	53.6	9,241	56.4	10,778	51.8
North Louisiana	192	2,325	12.1	338	6,650	19.7	960	548	4,286	5,332	5,246	122,775	23.4	5,880	122,950	20.9	5,438	23.0	6,218	20.8
South Louisiana	174	14,175	81.5	431	15,450	35.8	2,407	2,772	1,222	1,357	3,629	381,525	105.1	4,129	413,450	100.1	3,803	104.0	4,560	94.1
Michigan							296	387	3,131	3,268	3,427	48,500	4.2	3,655	44,500	12.2	3,427	14.2	3,655	12.2
Mississippi	112	2,900	25.9	130	3,600	27.7	495	476	737	886	1,232	124,700	101.2	1,362	97,200	71.4	1,344	94.9	1,492	67.6
Missouri									48	45	48	200	4.2	45	100	2.2	48	4.2	45	2.2
Montana							24	39	3,140	2,865	3,164	25,800	8.2	2,904	22,900	7.9	3,164	8.2	2,904	7.9
Nebraska									46	62	46	800	17.4	62	1,400	22.6	46	17.4	62	22.6
New Mexico	9	25	2.8	55	100	1.8	3,288	3,014	2,004	2,509	5,292	136,475	25.8	5,523	130,200	23.6	5,301	25.7	5,578	23.4
New York									23,000	22,800	23,000	12,400	0.5	22,800	13,400	0.6	23,000	0.5	22,800	0.6
Ohio							65	60	22,945	21,740	23,010	9,000	0.4	21,800	9,100	0.4	23,010	0.4	21,800	0.4
Oklahoma							1,380	1,426	51,731	52,934	53,111	450,200	8.5	54,360	409,600	7.5	53,111	8.5	54,360	7.5
Pennsylvania									84,000	83,700	84,000	32,900	0.4	83,700	27,600	0.3	84,000	0.4	83,700	0.3
Tennessee									29	35	29	50	1.7	35	100	2.9	29	1.7	35	2.9
Texas	1,287	25,250	19.6	1,298	27,500	21.2	37,970	33,122	71,673	75,645	109,643	*2,527,550	23.1	114,767	1,987,300	17.3	110,930	*23.0	116,065	17.4
Dist. 1: S. Central	4	100	25.0	5	50	10.0	246	277	3,189	3,282	3,435	27,900	8.1	3,559	26,050	7.3	3,439	8.1	3,564	7.3
Dist. 2: Middle Gulf	228	2,800	12.3	228	1,950	8.6	2,996	3,066	925	1,059	3,921	178,300	45.5	4,125	117,550	28.5	4,149	43.6	4,353	27.5
Dist. 3: Upper Gulf	410	14,600	35.6	446	18,400	41.3	4,892	4,816	3,842	4,391	4,734	501,900	57.5	9,207	368,700	40.0	9,144	56.5	9,653	40.1
Dist. 4: Lower Gulf-S.W.	180	2,800	15.6	212	2,700	12.7	4,091	4,181	5,282	5,497	9,373	249,900	26.7	9,678	186,800	19.3	9,553	26.5	9,890	19.2
Dist. 5: East Central	43	300	7.0	40	250	6.3	379	388	1,391	1,413	1,770	51,600	29.2	1,801	34,050	18.9	1,813	28.6	1,841	18.6
Dist. 6: Northeast	333	4,400	13.2	283	3,750	13.3	13,570	13,486	11,547	11,750	25,117	414,200	16.5	25,236	322,450	12.8	25,450	16.4	25,519	12.8
Dist. 7-B: N. Central	45	50	1.1	37	50	1.4	1,140	1,249	6,211	6,475	7,351	62,050	8.4	7,724	61,450	9.0	7,396	8.4	7,761	7.9
Dist. 7-C: West Central	2	75	37.5	9	50	5.6	287	438	1,473	1,608	1,760	50,225	28.5	2,046	51,250	25.0	1,762	28.5	2,055	25.0
Dist. 8: West	14	75	5.4	23	250	10.9	9,469	10,152	12,241	13,517	21,710	741,625	34.2	23,669	585,950	24.8	21,724	34.1	23,692	24.7
Dist. 9: North	22	25	1.1	10	25	2.5	877	1,050	18,911	19,571	19,788	144,275	7.3	20,621	140,675	6.8	19,810	7.3	20,631	6.8
Dist. 10: Panhandle	6	25	4.2	5	25	5.0	23	19	6,661	7,082	6,684	89,075	13.3	7,101	92,375	13.0	6,690	13.3	7,106	13.0
Utah							2	22	1		3	150	50.0	22	2,900	131.8	3	50.0	22	131.8
Virginia									15	15	15	100	6.7	15	100	6.7	15	6.7	15	6.7
West Virginia									16,200	15,900	16,200	7,100	0.4	15,900	7,800	0.5	16,200	0.4	15,900	0.5
Wyoming	12	275	22.9	20	500	25.0	336	464	4,222	4,452	4,558	143,925	31.6	4,916	130,700	26.6	4,570	31.6	4,936	26.6
Total United States	1,986	52,000	26.2	2,464	60,950	24.7	50,036	51,254	389,572	398,291	439,608	5,636,000	12.8	449,545	4,942,550	11.0	441,594	12.9	452,009	11.1

* Data on Texas production for end of 1948 by districts are from various sources and do not agree with state totals, which are on Bureau of Mines basis. State totals used in arriving at U. S. totals.

Efficiency increased by

And Equipment

THIS IS ONE OF TWO ARTICLES, devoted to new equipment and methods in drilling and production, transcribed from the January 31 meeting of the Houston Chapter, API. This group has for the past two years presented programs on what's new in drilling and production. Through the courtesy of the chapter and the speakers, WORLD OIL recorded both talks by wire recorder in order to give readers first-hand information. While many of the new ideas put to work in production during 1949 are really different applications of well-known principles, these new tools and techniques described have been of considerable aid in reducing costs and increasing efficiencies. Several items of new production equipment and production practices are briefly discussed.

THAT there is really nothing new under the sun is an old proverb that can easily apply to recent developments in production practices and equipment. What is described as new are actually different applications of well-known principles or modifications of current practices.

From 1940 until 1947, Sun Oil Company instigated a one-well cycling program in the Seabreeze field of Chambers County, Texas. The company owned a lease which was about to expire. The field has a gas cap. Through consent of the royalty owners, the operators devised and put into effect an injection program which resulted in additional revenue for the company, and royalty owners, and also saved the lease. The well on this lease was dually completed and was producing through tubing. The gas was separated through an 1800-pound per square inch separator, was then picked up by a one-stage compressor, boosted to 3500 pounds, and injected into the casing. Both completions were made into the gas cap of an oil sand.

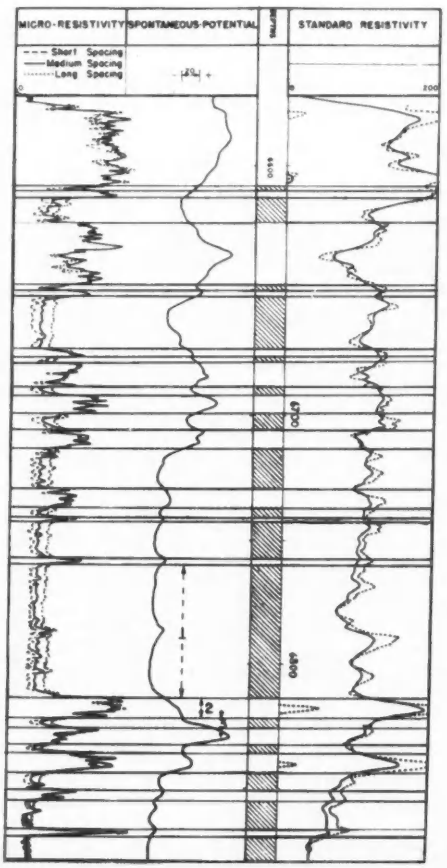
This lease over a period of seven years netted 59,000 barrels of oil, produced gas at the rate of approximately 3 million cubic feet per day, until 7 billion cubic feet had been processed. The lease was held until oil production became unprofitable, or until the gas could be sold, or other means of production could be established. It proved to be an ingenious device for holding a lease which might otherwise have been lost, and a considerable investment was saved.

Micro Electric Log

Introduced during 1949 was the micro log, an electrical logging device which is a valuable guide in making completions in hard formations. In these hard-formation areas, the problem is to locate the zone yielding oil. This micro log utilizes electrical contacts with spacings narrowed down to one and two inches (one model is slightly larger). It is quite a deviation from other electrical logging methods in that it is able to measure the resistivity of the mud cake. Knowing that a mud cake is formed opposite a porous medium where the filtrate can be absorbed, it follows that where a mud cake is found, a porous formation must exist.

In the soft formation areas of the Gulf Coast, the micro log is still in the experimental stage as to just what use it will have in the sandstones; however, considerable confidence has been built up on its application in hard rock areas. Permeabilities percepted by this tool are in the low range of from one to four millidarcys, and certainly production from this type formation might be questionable.

This type logging has been of valuable assistance in completing wells in the San Antonio area where the wells were previously cored foot by foot to locate the permeable section. In the log illustrated, the curve to the left is the resistivity side of the micro log. This curve would normally appear on the right side of the log, in contrast to the one on the far right with a normal electric log which is called standard resistivity. The spontaneous potential, or self-potential, curve on the left side of the log in limestone or dense formations will provide some indication of hardness. The resistivity will give more indication of hardness, but the section marked No. 1 on the log would have been questionable because the resistivity side is the same as it is in the section above. However, just below this section, a definite hard streak is indicated. The advantage of the micro log is that sharp demarcations in hard and in porous sections are ob-



Application of the micro-log in selecting porous sections where potential and resistivity curves make the selection difficult

tained. The hatched areas represent sections that possessed some permeability since a mud cake was built upon the wall, and the resistivity of the cake was recorded correspondingly.

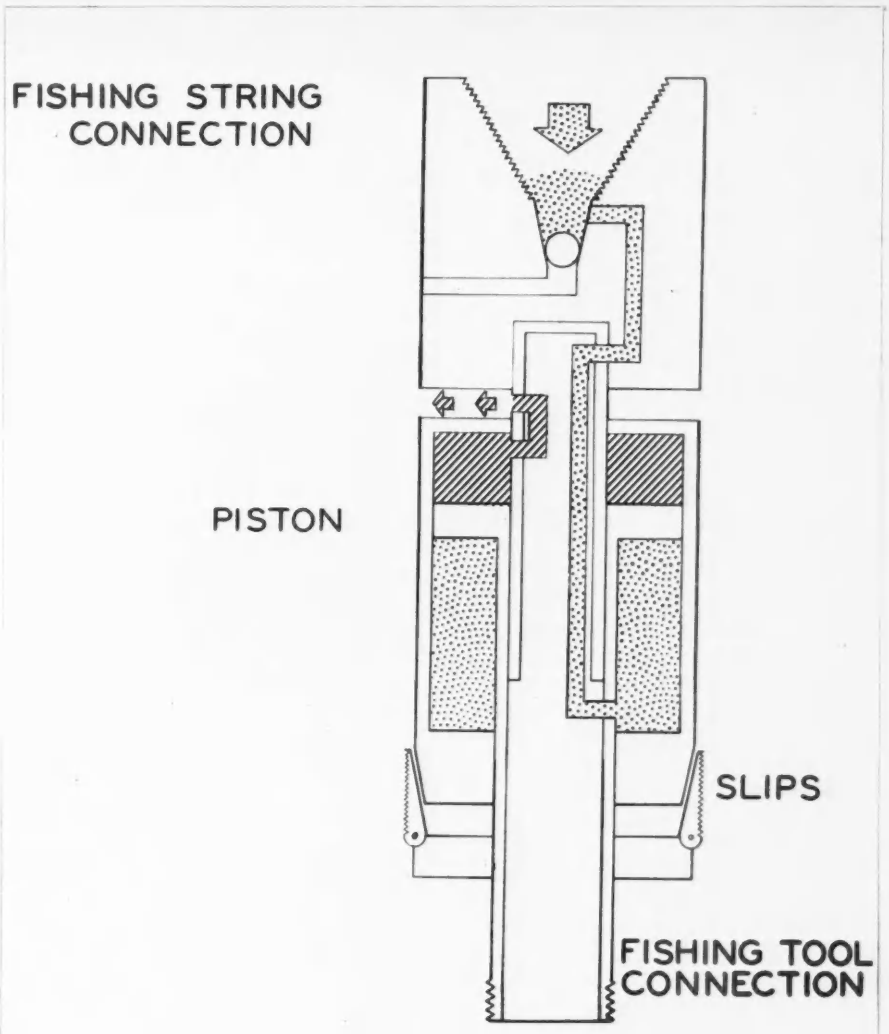
Hydraulic Fishing Tool

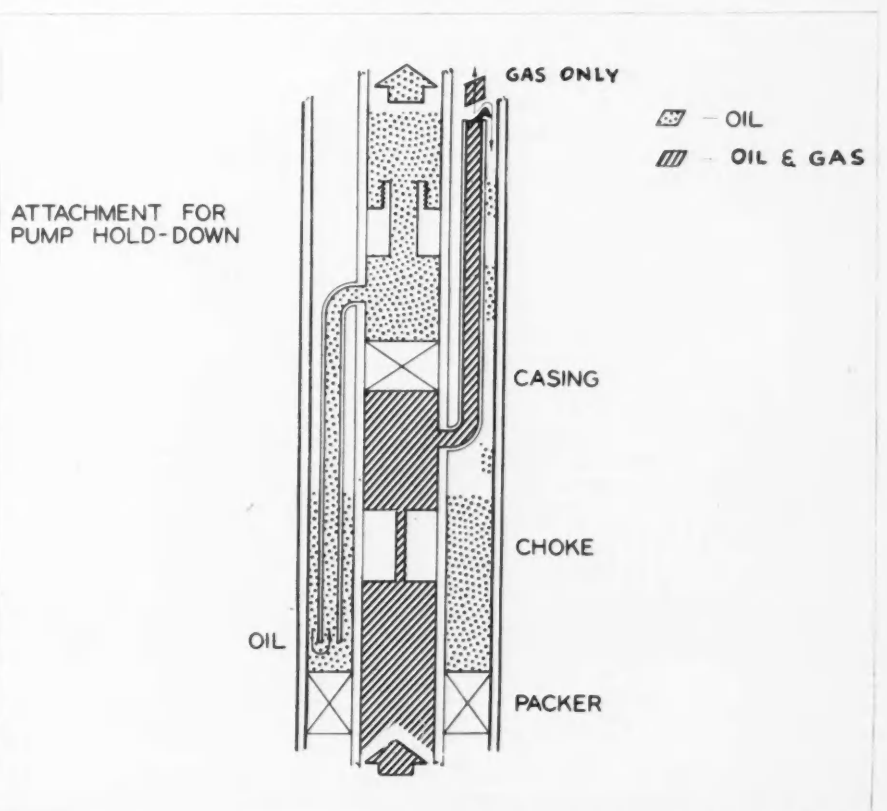
The hydraulic fishing tool shown in the schematic diagram is not a new instrument. Hydraulic means of lifting is an old art, but certain improvements have made it a very useful tool. This tool is run on a regular fishing string of drill pipe, to the bottom of which is connected any desired fishing device. The upper section is the hydraulic piston, actuated by fluid pumped in as the arrow indicates. After running the tool in the hole and engaging the fish, the ball is dropped and the fluid pumped into the hydraulic cylinder to lift the piston.

The piston then moves upward with the carrier and allows the slips to engage on the casing wall above the fish. In this manner, the pull to relieve the fish is against the lower casing without exerting undue strain on the drill pipe in the hole, the derrick, or lines on the surface. Of course, the piston has a limited travel, and means are provided for reversing the action so the piston can be pumped or jacked, permitting the slips to take a new bite into the casing each time. The fish is gradually jacked up the hole without exerting or straining the rig. This tool has proven valuable in eliminating screens from the open hole. Previously, it was a laborious process of finding where the screen was stuck. Because of inability to locate the exact stuck point, the screen had to be cut section by section. The disadvantage in pulling the screen by conventional methods lies in the requirements of a large rig at the surface. By employing this new tool, it has been possible to put very small rigs on the location and pull screen sections of much larger size than was previously possible.

Hydraulic Rig

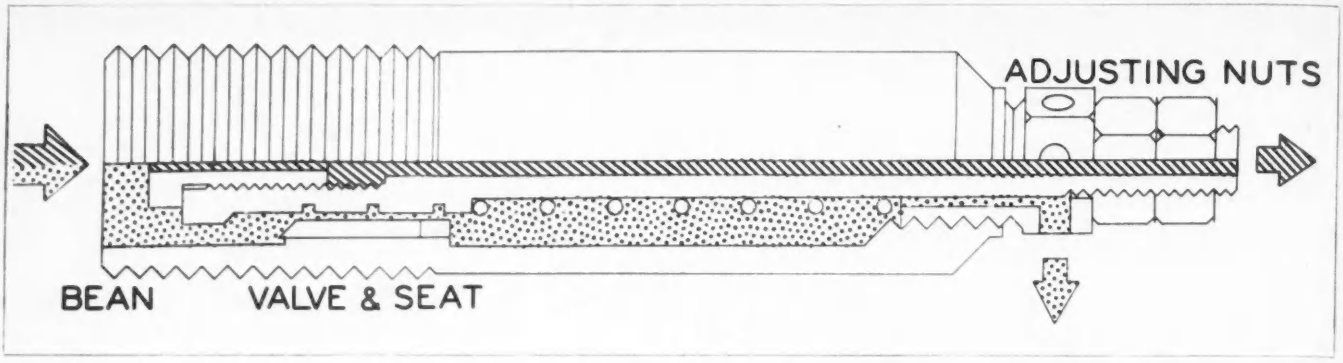
The Johnston hydraulic rig, formerly called the Hydraline, promises to be of considerable aid to the industry in per-





ABOVE: Schematic diagram of the hydraulic pulling tool showing the path of power liquid. With this device, the lifting force is applied from the bottom of the hole instead of imposing heavy loads on surface equipment.

BELOW: Combination bottom-hole choke and separator are incorporated into one tool and connected to the tubing string below the pump. By separating the gas at the bottom of the well, many pumping problems such as gas locking, sanding, pounding, etc., should be eliminated or reduced.



When properly installed on a well suited to its use, the automatic purger choke can be made to reduce gas-oil ratios. When the well heads, flow is directed entirely through the center choke section. As the tubing pressure drops, the lower path is opened by a pre-set spring to permit the passage of more fluid from the well.

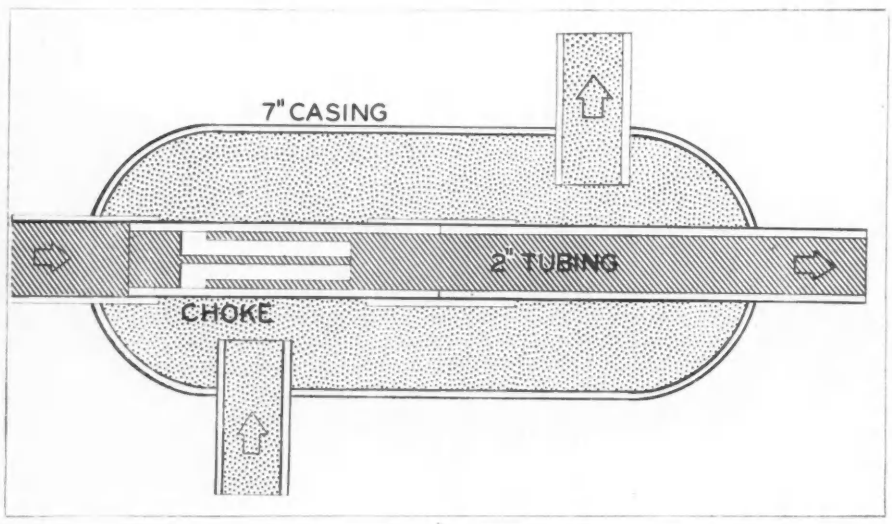
forming workovers by eliminating much of the rig machinery now in use. Items not required on the hydraulic rig include the drawworks, engine, travelling block and transmission. The rig utilizes the principle of hydraulically lifting the drill string with one line. Power is supplied by centrifugal pumps, either engine- or electrically-driven. The models now touring the country have a capacity of 2500 feet of 2½-inch tubing. It is equipped with a single hydraulic cylinder and mast. Down travel of the hook can be accelerated by injecting air below the hydraulic piston. This system should afford uniform hoisting, eliminate wire line travel, and certainly should be useful where it is difficult to move in heavy equipment. A double cylinder model of larger capacity is now under test. It has two upright hydraulic cylinders which exert twice the lifting force of a single unit.

Purger Choke

Certainly there is nothing new in purger chokes. This purger is described because recent experience using a simplified purger choke of this type properly installed has reduced gas-oil ratios. Wells which usually produce with high gas-oil ratios will waste much of the gas by producing on large chokes which keep the well from dying. If the well is pinched back to reduce or retard some of the gas, it will load up and die, and the pumper will be either calling out the swab units or he will be blowing too much gas into the well, or he is continually stop-cocking the well. This purger has been tried on several wells with considerable success. Fluid travels through the tool in the path indicated on the diagram so long as large volumes of fluid and low pressures are exerted at the well head. The choke merely goes inside a regular positive choke nipple and replaces the common positive choke normally used. It has an insert which can be seen immediately below the half section and is drilled to a predetermined choke size.

The insert is free to move in and out of the whole choke assembly by means of a spring indicated at bottom. This spring is set to predetermined loads and when the pressure decreases to a certain point it opens the path which is depicted at bottom, thereby letting more fluid pass through the well. As the pressure builds up, the passage snaps closed, forcing the fluid to flow through the center of the choke.

By way of illustration, on one well where the gas-oil ratio varied from 17,000 to 20,000 to 1, every month for a year, production averaged about eight barrels daily. First day after installing the purger choke, the ratio dropped to 6000 to 1; three days later the ratio dropped to 3000 to 1. With further manipulation of the spring setting a month later, the ratio went down to 1000 to 1 and the well is producing 15 barrels daily. This has continued for several months. Reasons for this may lie in the fact that coning of the gas has stopped by keeping the well bore in more uniform pressure loading by permitting the fluid column to increase in a low fluid level well so that the oil stands opposite the sand section, possibly to increase the relative permeability of the sand to oil. There have been other cases where this same result was obtained in using a purger choke to reduce gas-oil ratios.



Designed by field personnel, this simplified heat exchanger prevents freezing of the gas line at the choke in a gas-lift system. Fluid from the well flows through the seven-inch casing swedged about the flow line.

Credit to Field Personnel

The pumper and the man in the field are due the credit for a simple yet effective heat exchanger enclosing a choke on a gas lift line that would freeze up in winter, causing many shut down days. A piece of casing was swedged around the flow line at the choke to make a water jacket as shown. Gas-lift wells making large volumes of water were flowed through the jacket to heat up the gas flowing through the choke. Credit is due the field men who supply such ideas that cost relatively little but save the companies lots of money.

Bottom-Hole Separator

Illustrated is a new model of an old principle. It is a combination bottom-hole choke and a bottom hole separator

for pumping wells. The bottom-hole choke is adaptable, of course, to low fluid level wells to prevent surging in pumping, and possibly to stop some of the sand troubles. It should promote uniform pumping, eliminate pounding, as well as cure other ills of pumping wells.

Separation of the gas is certainly nothing new, but when combined with the choking idea in one tool, a very effective device results. The bottom-hole separator, as shown in the diagram, makes the flow uniform as the pump just above it operates. Fluid is drawn through a small outlet at the right and exhausts at the top where the gas passes on up the casing while the oil is dumped to bottom. From here it is picked up through the small tube at left and brought up to the surface as relatively dead oil, eliminating gas locking, etc. New models of this production tool will be available soon where all the small piping is completely enclosed within the tubing. Previous objection to former models has been centered around the small pipes on the outside of the tubing where they are damaged or broken when going in the hole. With this small piping totally enclosed within the tubing, the bottom-hole separator should be more easy to run in the hole and more serviceable to the industry.

Teleflood Meter

The teleflood meter is a bottom-hole flow meter developed by Sperry Sun Well Surveying Company and used by Sun Oil Company in some shallow dump water, water-drive operations where upper water sands are perforated to water-flood a lower sand and the volume of water passing between the two is to be measured. The teleflood meter is a vane-type water meter which actuates a hammer. This hammer taps on a steel rod which carries the impulse to the surface where it is recorded. Devices of this type will aid the operators in more efficient production.

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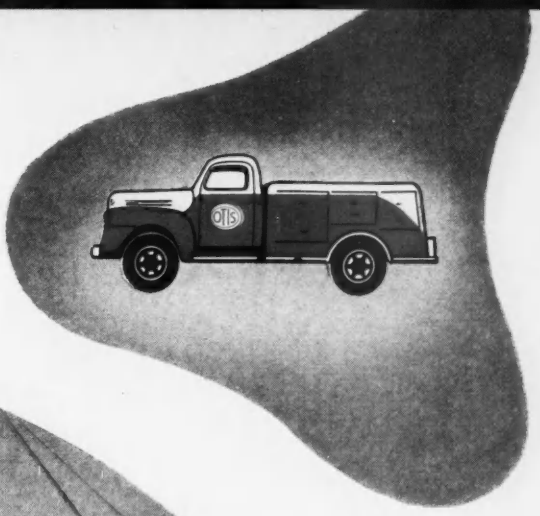

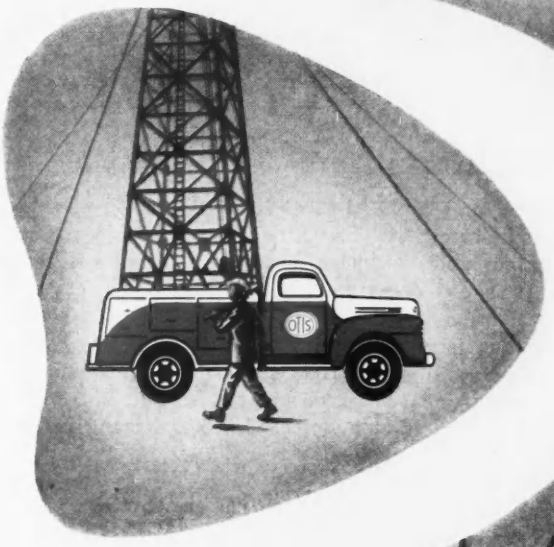

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LPG Sales Continue to Soar

By K. W. RUGH and E. O. MATTOCKS
Phillips Petroleum Company, Bartlesville, Oklahoma

THE liquefied petroleum gas industry continued its steady growth of increased sales during the year 1949. It is estimated that during 1949 the total volume of liquefied petroleum gas marketed in the United States was 2725 million gallons. This represents an 8.5 percent increase over the volume sold in 1948.

The fact that the increase in sales volume during the year 1949 was 8.5 percent when increases during the past few years have ranged from 25 percent to 30 percent does not in itself indicate that continuing lesser percentage increases in marketed volume can be expected during the next few years. The percent increase in 1949 was low because of the mild weather in the winter of 1948-1949 in those areas where liquefied petroleum gas is used extensively for house-heating and because many new natural gas transmission lines were placed in operation during the year 1949. Some of the liquefied petroleum gas used by utilities was displaced by this new supply of natural gas. Over a period of years we can assume that normal winter temperatures and demand for liquefied gas to augment natural gas supplies during peak conditions will again create the normal increased demand for liquefied petroleum gas and the industry will again enjoy its traditional large percentage increases.

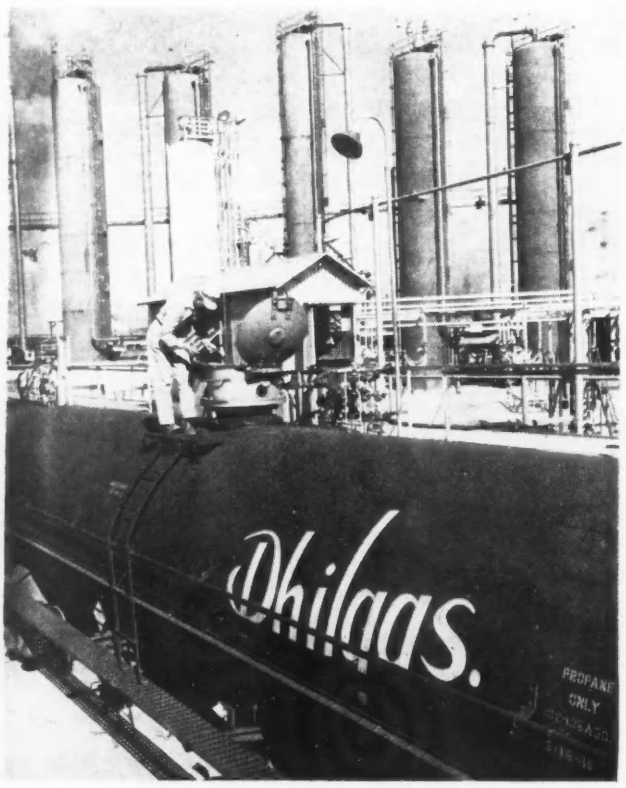
It is estimated that the volume of LPG sold for domestic purposes in 1949 reached 1650 million gallons. This represents an increase over 1948 sales of 12 percent. The demand from present consumers for additional gas appliances and the demand from new consumers for LPG for cooking, water heating, refrigeration and space heating was as much in evidence as during any previous year. The winter of 1948-1949 was relatively mild throughout wide areas in which LPG is used for space heating, which resulted in a decrease in demand for the product during the heating season; nevertheless the increased demand from new consumers together with the increased year around demand from existing consumers resulted in an appreciable increase in total demand for household use of LPG.

1949 Consumption

It is estimated that there are 6.5 million homes enjoying the use of LPG service in farm and suburban homes beyond the gas mains.

The volume of LPG used in 1949 for industrial purposes, internal engine operation and other miscellaneous industrial uses is estimated at 310 million gallons. This represents an increase over that consumed in 1948 of 0.3 percent. During 1949 many industrial plants turned to LPG for their major source of fuel. In addition, as natural gas lines were extended, making natural gas available to many industrial plants, some of these plants installed LPG standby installations to serve as the fuel supply during emergencies when the natural gas supply is interrupted, or during winter months when household and industrial plant space heating requirements cause curtailment of natural gas supplies normally available for manufacturing purposes. The continued demand for LPG for either constant use or standby use indicates a continuing expanded market for LPG to industrial plants.

For gas manufacturing purposes it is estimated that 240 million gallons were used in 1949. This represents an increase of 1 percent over the volume used for gas manufacturing in 1948. The gas manufacturing industry uses LPG in the smaller communities to make the complete send-out of gas and in the larger communities to augment manufactured or natural gas supplies during peak load conditions or to entirely replace manufactured or natural gas during emergency periods. There are approximately 400 gas manufacturing plants in the country using liquefied petroleum gas as their sole source of supply. In the larger communities where liquefied gas is used to augment supplies during peak load periods or as emergency standby, the gas companies have installed large storage for LPG. Because of the mild 1948-1949 winter the demand on the part of these utilities for LPG was not comparable with other years of normal winter weather. Now that these utilities are again connecting to gas appliances for domestic space-heating and other uses it is anticipated that the winter demands will again increase be-



Liquefied petroleum gas tank car being gauged at refinery loading dock.

A 35-cubic-yard bottom dump earth hauler in action fueled by liquefied petroleum gas.

yond the capacity of their normal gas manufacturing facilities or natural gas supplies. This will create increased demands on the part of the gas industry for liquefied petroleum gas.

LPG is continuing to be accepted as an ideal raw material by the chemical industry for the production of chemical intermediates. A number of plants under construction or just completed in 1948 have been on stream during most of 1949. It is estimated that the LPG used by chemical manufacturers during 1949 was 525 million gallons which is an increase of 6.9 percent over that consumed in 1948.

During 1949 the use of LPG for tractor fuel was greatly accelerated. This increased use was brought about not only by the recognition of the economical and mechanical advantages from its use, but also by the development of a low cost method whereby LPG could be utilized in the conventional carburetion system interchangeable with the liquid fuel for which the engine was originally equipped. Considerable interest is being shown in the use of LPG to fuel trucks and busses on the highway, and a continuing demand exists for LPG to fuel engines in heavy duty construction and mining equipment.

Interest in safety has continued at a high level during the year. The Interstate Commerce Commission has issued new specifications governing the transportation of liquefied petroleum gas in cargo tanks (truck tanks), and portable tank containers (skid tanks). Likewise, during the year the National Fire Protection Association issued a new set of standards for the design, installation and construction of containers and pertinent equipment for the storage and handling of liquified petroleum gases at utility gas plants. This has been issued by The National Board of Fire Underwriters as its NBFU Pamphlet No. 59. Likewise, the NFPA revised its standards for the design, installation and construction of containers and pertinent equipment for the storage and handling of liquefied petroleum gases. This was issued by the National Board of Fire Underwriters as its NBFU Pamphlet No. 58 dated March, 1949.

The quantity of liquefied petroleum gas now being marketed classifies this industry as one of the major fuel suppliers in this country. Known reserves and presently available but unrecovered volumes of LPG indicate adequate quantities for the increasing future demands.

Marketed Production of Liquefied Petroleum Gas

YEAR	TOTAL SALES		DISTRIBUTION—1000 Gallons							
	Gallons in Thousands	Percent Increase	Domestic[1]	Percent Increase	Ind. and Miscl.[2]	Percent Increase	Gas Mfg.	Percent Increase	Chemical Mfg.	Percent Increase
1922	223	....	Sale of Liquid Petroleum Gas Confined Primarily to Bottled Gas Business Prior to 1928							
1923	277	24.4								
1924	376	36.0								
1925	404	7.2								
1926	465	15.2								
1927	1,091	134.6								
1928	4,523	314.6	2,600	....	400	....	1,500	....	.....	....
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7	.....	....
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0	.....	....
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57.6	.....	....
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9	.....	....
1933	38,931	14.1	16,626	2.3	13,987	71.3	8,318	—14.3	.....	....
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,298	—24.3	.....	....
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4	.....	....
1936	106,652	38.8	30,014	40.4	67,267	40.4	9,371	23.6	.....	....
1937	141,400	32.6	40,823	36.0	62,610	[3]	11,175	19.3	26,792	....
1938	165,201	16.8	57,832	41.7	62,694	0.0	12,386	10.8	32,299	20.5
1939	223,580	35.3	87,530	51.4	93,723	49.4	15,435	24.6	26,892	—16.7
1940	313,456	40.2	134,018	53.1	124,482	32.8	20,285	31.4	34,671	29.0
1941	462,852	47.7	220,722	64.7	172,669	38.6	25,255	24.5	44,206	27.5
1942	585,440	26.5	303,857	37.6	197,179	14.2	31,366	24.2	53,038	20.0
1943	675,233	15.3	344,962	13.6	237,396	20.4	37,519	19.6	55,356	4.4
1944	898,071	33.0	445,617	29.2	254,590	7.3	45,879	22.3	151,985	175.0
1945	1,067,979	19.0	533,262	19.7	256,577	0.8	53,849	17.4	224,291	47.5
1946	1,410,370	32.1	758,466	42.2	253,745	—1.1	86,660	61.0	311,499	38.8
1947	2,008,262	42.4	1,150,538	51.7	274,125	8.0	169,332	95.4	414,267	33.0
1948	2,511,160	25.0	1,473,289	28.1	309,269	12.8	237,638	40.3	490,964	18.6
1949	2,725,000	8.5	1,650,000	12.0	310,000	0.3	240,000	1.0	525,000	6.9

[1] Household use plus other requirements by these customers such as irrigation pumping, tractor fuel, flame weeding, chicken brooding and similar uses. Included also is LPG sold by domestic distributors but used for industrial purposes, internal combustion engine fuel and for gas manufacturing purposes.

[2] Includes LPG sold for fueling internal combustion engines.

[3] Not comparable due to segregation of chemical manufacturing.

REMARKS: In this table total sales for all years except 1949, were obtained from U. S. Bureau of Mines reports. Distribution for the years 1931 to 1948, inclusive, was obtained from the same source. All other volumes were estimated by the writers. The total sales volume includes all LPG (propane, butane and propane-butane mixtures) when sold as such. Until 1944 the sale of pentane when sold for any purpose other than motor fuel blending was included. Since then it has been excluded. It does not include butane when blended with heavier petroleum fractions for motor fuel purposes. Intercompany sales transactions such as purchases of LPG by one company from other companies and resold as LPG have been eliminated in order to avoid duplication of sales figures. The data do not reflect sales of LPG used directly by the producer at the point of production for fuel polymerization, solvent de-waxing, etc. Neither do the figures include sales of hydrocarbons to plants manufacturing synthetic rubber or aviation gasoline or their components.

Curtailed in 1949,

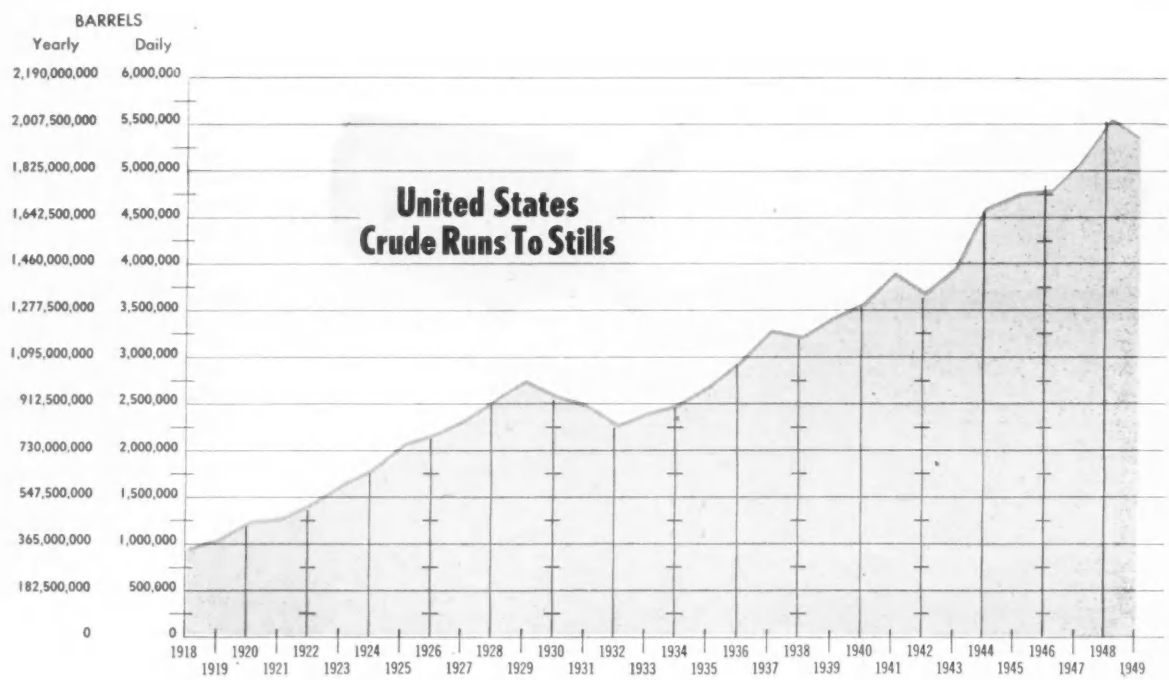
To Continue Below Record Level

REFINING operations in 1949 were curtailed substantially as crude runs and output of U.S. refineries dropped sharply from the peak levels of 1948. This was in reflection of the failure of petroleum consumption to continue its usual increase, and by the discontinuation of large additions to refined product stocks.

While some of the ground lost is expected to be regained this year, prospects do not indicate that 1950 refining activity will equal that of 1948. The U. S. Bureau of Mines forecast estimates that a daily average of 5,452,000 barrels of crude will need to be run to stills by refining plants during 1950. This would be 128,000 barrels per day more crude than charged to stills during 1949, but would be 97,000 barrels per day less than put through refineries in 1948. However, should abnormally cold weather be experienced next winter, runs would have to be increased above the Bureau's estimate to supply enough heating oil.

Last year's decrease in refining operations was the first decline since 1942, and one of the few in the history of the industry. A total of 1,943,254,000 barrels of crude was processed in refinery stills during 1949, which was 87,416,000 barrels less than in the preceding year. The processing of this quantity of crude by refiners resulted in the establishment of a daily average crude runs to stills for 1949 of 5,324,000 barrels, which was 225,000 barrels less per day than the 5,549,000 barrel daily average in 1948.

However, a very substantial portion



(All Figures In Barrels)

YEAR	Annual Total	Daily Average	YEAR	Annual Total	Daily Average	YEAR	Annual Total	Daily Average	YEAR	Annual Total	Daily Average
1918.....	326,025,000	893,200	1926.....	779,264,000	2,135,000	1934.....	895,636,000	2,453,800	1942.....	1,334,103,000	3,655,000
1919.....	361,520,000	990,500	1927.....	828,835,000	2,270,800	1935.....	965,790,000	2,646,000	1943.....	1,429,738,000	3,917,000
1920.....	433,915,000	1,185,600	1928.....	913,295,000	2,495,300	1936.....	1,068,570,000	2,919,000	1944.....	1,665,684,000	4,551,000
1921.....	443,363,000	1,214,700	1929.....	987,708,000	2,706,100	1937.....	1,183,440,000	3,242,000	1945.....	1,719,534,000	4,711,000
1922.....	500,706,000	1,371,800	1930.....	927,447,000	2,541,000	1938.....	1,165,015,000	3,191,800	1946.....	1,730,197,000	4,740,000
1923.....	581,238,000	1,592,400	1931.....	894,608,000	2,451,000	1939.....	1,237,840,000	3,391,000	1947.....	1,852,246,000	5,074,600
1924.....	643,719,000	1,758,800	1932.....	819,997,000	2,240,400	1940.....	1,294,283,000	3,536,300	1948.....	2,030,670,000	5,549,000
1925.....	739,920,000	2,027,200	1933.....	861,254,000	2,359,600	1941.....	1,409,192,000	3,860,800	1949.....	1,943,254,000	5,324,000
									1950 Est..	1,990,000,000	5,452,000

Source:—U. S. Bureau of Mines, except for latest year which has been calculated from Bureau statistics for first 10 months and American Petroleum Institute weekly reports for the last two months.

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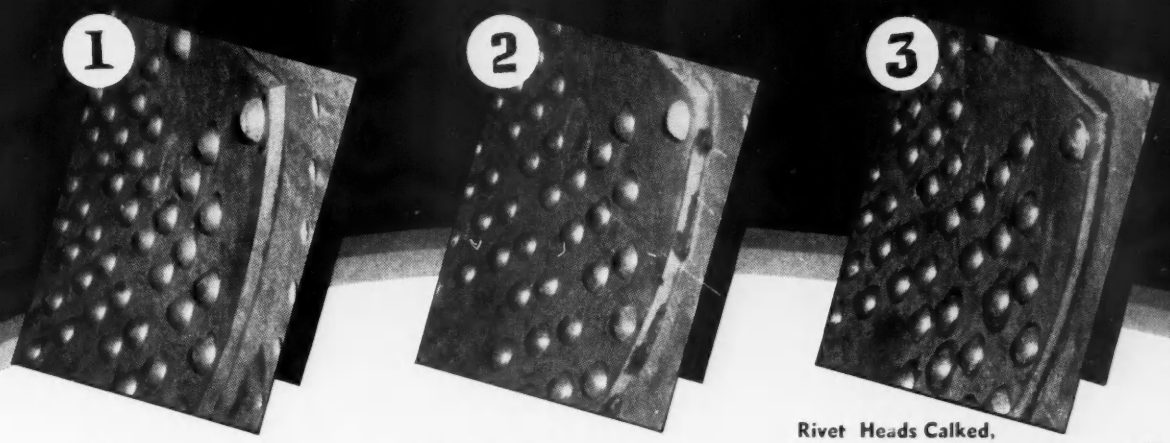
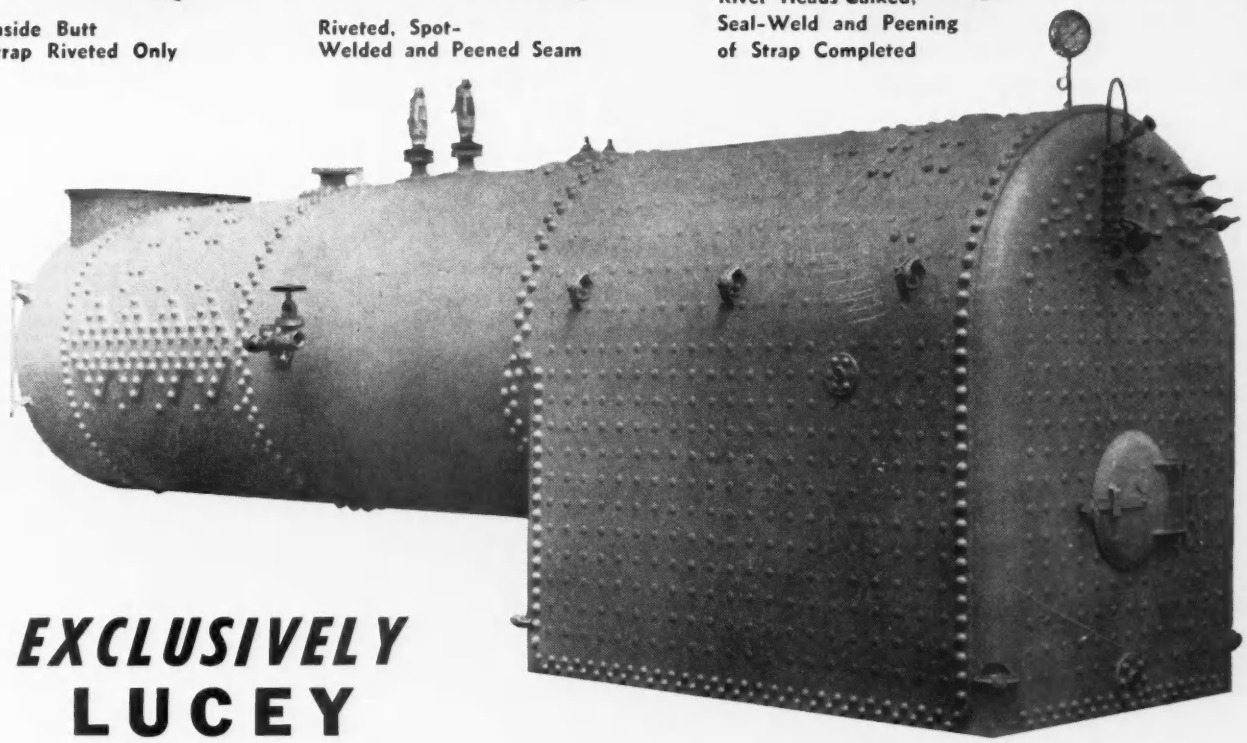


Inside Butt Strap Riveted Only

Riveted, Spot-Welded and Peened Seam

Rivet Heads Calked, Seal-Weld and Peening of Strap Completed



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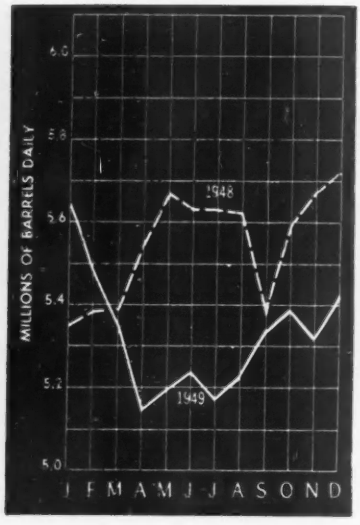
of the decline in crude runs can be attributed to the reduced rate at which refined products stocks were increased in 1949. The record volume of crude processed by plants in 1948 resulted in the addition of 218,000 barrels per day to refined products inventories, but in 1949 these stocks were increased by only about 25,000 barrels daily.

The U. S. again appears to have adequate refining facilities, daily capacity at the end of 1949 totaling 6,572,000 barrels in contrast with 6,076,000 barrels a year previous. The gain in capacity, coupled with the reduction in runs permitted plants to again resume a normal operating pattern. Whereas refineries in December, 1948, were operating at the abnormally high rate of 94.2 percent of capacity, they were running at a normal 82.5 percent of capacity in December, 1949. Most of the increased refining capacity was installed in the East Coast and Texas Gulf Coast districts, daily capacity of the former advancing by 141,000 barrels while the latter was gaining 136,000 barrels.



Daily Average Crude Runs To Stills By Months

MONTH	1949	1948
January	5,640,900	5,348,300
February	5,480,000	5,379,800
March	5,352,200	5,387,300
April	5,140,800	5,539,900
May	5,195,300	5,667,900
June	5,162,000	5,631,700
July	5,172,800	5,630,500
August	5,241,400	5,620,700
September	5,427,100	5,376,000
October	5,373,200	5,594,500
November	5,271,000	5,672,100
December	5,004,000	5,720,500

Source: U. S. Bureau of Mines except for last two months of 1949.

Refinery Production of Major Products and Percent Yield from Crude Run at U. S. Refineries

Results in December and Year, 1949, compared with same periods in 1948 and 1941. Figures are from Bureau of Mines except that November and December, 1949, are estimated with aid of A.P.I. weekly bulletins.

(THOUSANDS OF BARRELS)

ITEM	1941	1948	1949	% Diff. '41-'49	% Diff. '48-'49
*Gasoline:					
Production, December	61,640	74,229	66,621	+ 8.1	— 10.2
(Daily Average)	1,988	2,394	2,149	+ 8.1	— 10.2
Percent Yield from Crude	45.7	41.6	39.6	.....	.....
Production, Whole Year	671,110	894,996	844,070	+ 25.8	— 5.7
(Daily Average)	1,839	2,445	2,313	+ 25.8	— 5.4
Kerosine:					
Production, December	6,682	10,851	10,569	+ 58.2	— 2.6
(Daily Average)	215	350	341	+ 58.2	— 2.6
Percent Yield from Crude	5.3	6.1	6.3	.....	.....
Production, Whole Year	72,586	121,853	102,133	+ 40.7	— 16.2
(Daily Average)	199	333	280	+ 40.7	— 15.9
Distillate Fuel Oil:					
Production, December	17,142	34,274	32,124	+ 87.4	— 6.3
(Da ly Average)	553	1,106	1,036	+ 87.4	— 6.3
Percent Yield from Crude	13.7	19.2	19.1	.....	.....
Production, Whole Year	189,177	380,639	340,726	+ 80.1	— 10.5
(Daily Average)	518	1,040	933	+ 80.1	— 10.3
Residual Fuel Oil:					
Production, December	31,127	40,276	37,540	+ 20.6	— 6.8
(Daily Average)	1,004	1,299	1,211	+ 20.6	— 6.8
Percent Yield from Crude	24.9	22.6	22.3	.....	.....
Production, Whole Year	342,367	466,141	424,094	+ 23.9	— 9.0
(Daily Average)	938	1,274	1,162	+ 23.9	— 8.8
Lubricants:					
Production, December	3,554	4,368	4,034	+ 13.5	— 7.6
(Daily Average)	115	141	130	+ 13.5	— 7.6
Percent Yield from Crude	2.8	2.5	2.4	.....	.....
Production, Whole Year	39,539	51,416	45,134	+ 14.2	— 12.2
(Daily Average)	108	140	124	+ 14.2	— 12.0

* Production includes straight run, cracked, and natural blended at refineries. Yield indicates percent of crude runs made into straight run and cracked gasoline.

Crude Runs to Stills in U. S. Refineries and Percent of Refinery Capacity Used by Districts, December and Years 1941, 1948 and 1949

Runs from Bureau of Mines, except November and December, 1949, from American Petroleum Institute: Capacities from American Petroleum Institute

(THOUSANDS OF BARRELS)

Refining District	CRUDE RUN IN DECEMBER: Total Amount Run During Month				CRUDE RUN IN DECEMBER: Daily Average Run During Month			REFINING CAPACITY AND USE IN DECEMBER: Daily Capacity			REFINING CAPACITY AND USE IN DECEMBER: Percent Capacity Used			CRUDE RUN DURING YEAR: Total Amount Run During Year			CRUDE RUN DURING YEAR: Daily Average Run During Year			
	Dec., 1941	Dec., 1948	Dec., 1949	% Diff. '48-'49	Dec., 1941	Dec., 1948	Dec., 1949	Dec., 1941	Dec., 1948	Dec., 1949	Dec., 1941	Dec., 1948	Dec., 1949	1941	1948	1949	1941	1948	1949	% Diff. '48-'49
East Coast	19,750	26,540	26,462	— 0.3	637	856	854	704	854	995	90.5	100.2	85.8	217,046	317,257	280,373	595	867	768	— 11.4
Appalachian	4,575	5,385	4,807	— 10.7	148	174	155	174	193	193	85.1	90.2	80.3	53,499	57,637	56,576	147	157	155	— 1.3
District No. 1	.....	3,145	2,813	— 10.6	.....	102	91	.....	125	118	.....	81.6	77.1	.....	36,317	33,323	.....	99	91	— 8.1
District No. 2	.....	2,240	1,994	— 11.0	.....	72	64	.....	68	75	.....	105.9	85.3	.....	21,320	23,253	.....	58	64	+ 10.3
Ill., Ind., Ky	22,078	29,094	29,245	+ 0.5	712	939	943	776	1,015	1,134	91.8	92.5	83.2	251,257	332,233	333,156	688	908	913	+ 0.6
Okla., Kans., Mo.	10,711	13,540	13,385	— 1.1	346	437	432	418	497	536	83.3	87.9	80.6	127,130	165,249	154,874	348	452	424	— 6.2
Texas Inland	5,761	7,761	6,029	— 22.3	186	250	194	265	296	277	70.2	84.5	70.0	66,640	89,909	79,380	183	246	217	— 11.8
Texas Gulf Coast	33,919	45,497	41,004	— 9.9	1,094	1,468	1,323	1,117	1,446	1,582	97.9	101.5	83.6	363,252	509,587	468,766	995	1,392	1,284	— 7.8
Louisiana Gulf Coast	4,925	14,021	14,087	+ 0.5	159	452	454	172	401	458	92.4	112.7	99.1	54,300	159,223	157,815	149	435	432	— 0.7
Ark., and La. Inland	2,613	2,618	2,328	— 11.1	84	85	75	97	99	96	86.6	85.9	78.1	29,365	29,759	27,448	80	81	75	— 7.4
Rocky Mountain	2,848	5,155	5,651	+ 9.6	92	166	182	137	194	235	67.2	85.6	77.4	33,570	59,631	64,473	92	163	177	+ 8.5
District No. 3	.....	432	355	— 17.8	.....	14	11	.....	15	15	.....	93.3	73.3	.....	4,603	4,258	.....	13	12	— 7.6
District No. 4	.....	4,723	5,296	+ 12.1	.....	152	171	.....	179	220	.....	84.9	77.7	.....	55,028	60,215	.....	150	165	+ 10.0
California	17,805	27,724	25,106	— 9.4	574	894	810	787	1,081	1,066	72.9	82.7	76.0	213,133	310,185	320,393	584	848	878	+ 3.5
Total United States	124,985	177,335	168,104	— 5.2	4,032	5,721	5,422	4,647	6,076	6,572	86.8	94.2	82.5	1,409,192	2,030,670	1,943,254	3,861	5,549	5,324	— 4.1

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If a tool joint is damaged by careless handling, you save transportation costs. Instead of having to pay for sending the length of pipe to a shop, you simply replace the damaged joint *right at the rig!*

AND YOU DON'T TAKE CHANCES

The successful use of over two million Reed Super Shrink-Grip Tool Joints has proved beyond doubt that there are no safer tool joints made. Ask your Reed Representative for the full story.

If drill pipe is bent or crushed, you don't lose your tool joints. Instead of buying new pipe *with* tool joints, you simply buy the drill pipe and transfer your Reed Super Shrink-Grip Tool Joints to the new pipe at the rig.

If tool joints are worn and pipe is still good, you can save the transportation costs of "shopping" your drill string for tool joint repair or replacement. Reed Super Shrink-Grip Tool Joints are easily replaced *at the rig!*

If you reverse ends of your drill pipe when you change tool joints, you increase pipe life by distributing slip wear to both ends of the pipe. This greatly reduces drill string costs.

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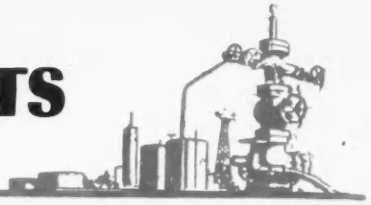
PRODUCTION HINTS

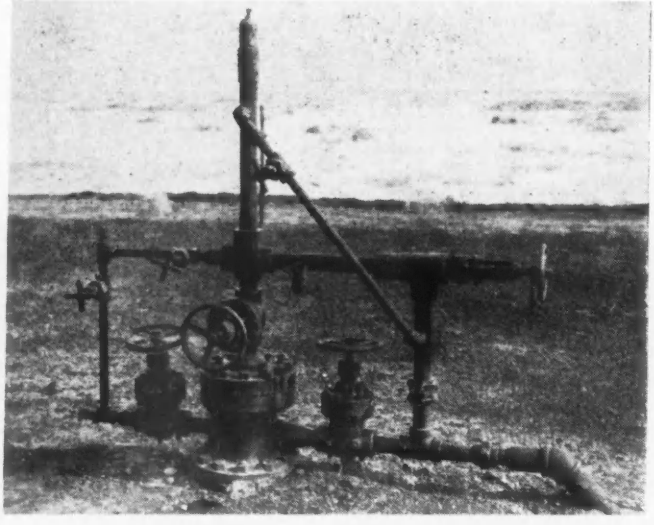
How to do it!



$10 is paid for each illustrated acceptable contribution. Mail to The Editor, WORLD OIL, P. O. Box 2608, Houston 1, Texas

HOW TO—Add Bleed-Off Line to Well Head

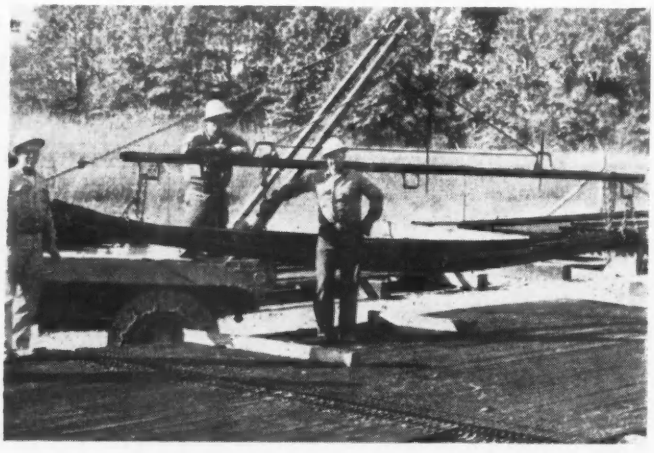
Breaking out fittings on the tubing head when a pressure bomb is being run into or removed from a flowing well sometimes results in a spray of gas and oil, and may represent a personnel hazard if care is not exercised to bleed off pressure above the main tubing head valve. A company operating in West Texas equips each well with a bleeder line, which, when the well is closed off, permits pressure to be bled off from the riser into the well lead line. The bleeder is a length of extra-heavy one-inch pipe equipped with a high-pressure valve and union. It is run at a 45-degree angle between the riser and a point on the downstream side of the bean on the flow line. A short nipple is welded into the side of the riser and another on the corresponding side of the nipple coming out of the bean.



This installation requires a minimum of piping, does not interfere with normal operation of the well, and is neat. The only extra amount of work is in welding in of the two short nipples. By completing and making up each well head in exactly the same manner, the crossover nipple and fittings can be precut and partially made up, thus simplifying the installation work in the field.

HOW TO—Haul Pulling Rods Without Trailer

Hauling pulling rods from the production camp yard to a well being placed on the pump usually requires the use of a truck and trailer to handle safely the long flexible rods. Here is an idea that obviates the need for a trailer to adequately handle sucker rods in the field. All that is needed is this rod support, a boom truck and winch.



The rod support illustrated is a joint of 3½-inch drill pipe which had been removed from drilling service. Brackets of heavy steel rods have been welded to either end and at the center. On the side opposite the joint of pipe and half way between those brackets are two other such brackets which serve as lifting lugs.

The sucker rods are bundled at the storage yard and tied securely at each end with a short section of chain. The truck is backed up to the rod bundle and the rod support is lowered. The chains are looped through the end brackets and fastened. If desired, a middle chain tie can be made, in the event a large bundle is carried.

A wire rope sling threads through the two lifting brackets as shown and ties to the winch line which is threaded over the sheave of the boom. The rod bundle is then lifted and rotated so that it presses up against the boom poles. It is then secured in this position so that a minimum road width is required.

It is not safe nor recommended to haul pulling rods in this manner on public roads where the danger of passenger cars running into the rod bundle exists. This is a safe practice within the oil field, and saves in loading and unloading time, in addition to eliminating the need for a trailer or long truck. Once on the well site, two men can easily discharge the load of rods at the most convenient location.

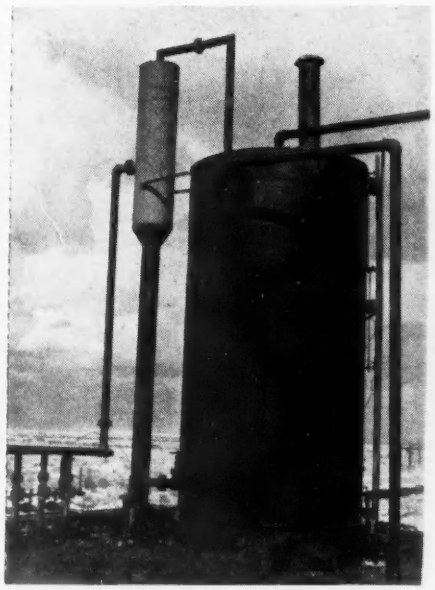
PRODUCTION HINTS

HOW TO—

Separate Gas, Oil At Treating Tank

Where gas production is insufficient to warrant installation of a separator, yet enough to cause trouble in treating the oil if not removed, a flume beside the treating tank will usually solve the problem. Made from a stand of seven-inch pipe which is enlarged to 12 inches in the top, the flume connects to the bottom of the treating tank, and is held stationary by two pieces of strap iron welded to the tank.

The inlet line from the flow line header



is connected approximately one-third the distance from the bottom of the larger pipe, which is eight feet long. A four-inch gas and overflow pipe connects the top of the flume to the top of the treating tank.

In operation, the oil-gas-water mixtures enter the flume and the gas passes off into the treating tank where it can be used for fuel. The oil and water pass down through the flume where they begin to separate and the separation is completed as they are washed up through the treating tank.

Production from several wells is handled in this manner through the production header at left. Very little back pressure is held on the flow line so that a maximum of production will be made. For this reason, it was necessary to place the small gas separator on the water leg so that liquid separated from the gas would flow by gravity into the treating tank.

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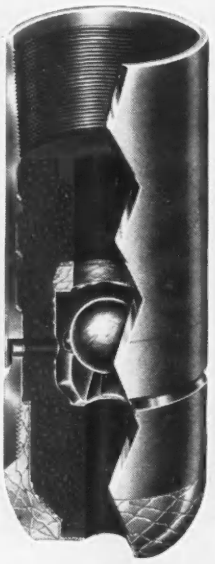
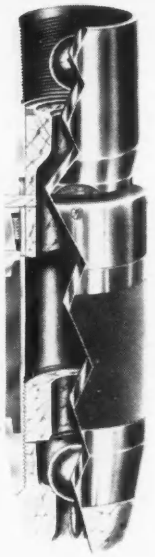
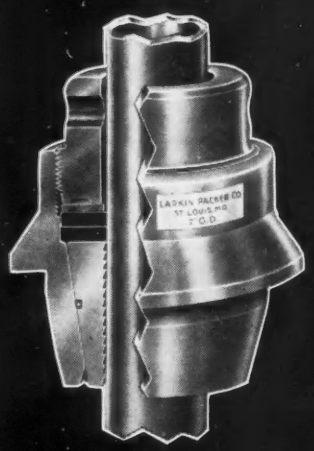


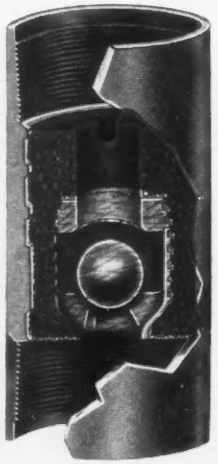
GEYSER SHOES



CEMENTROL



TUBING HANGERS



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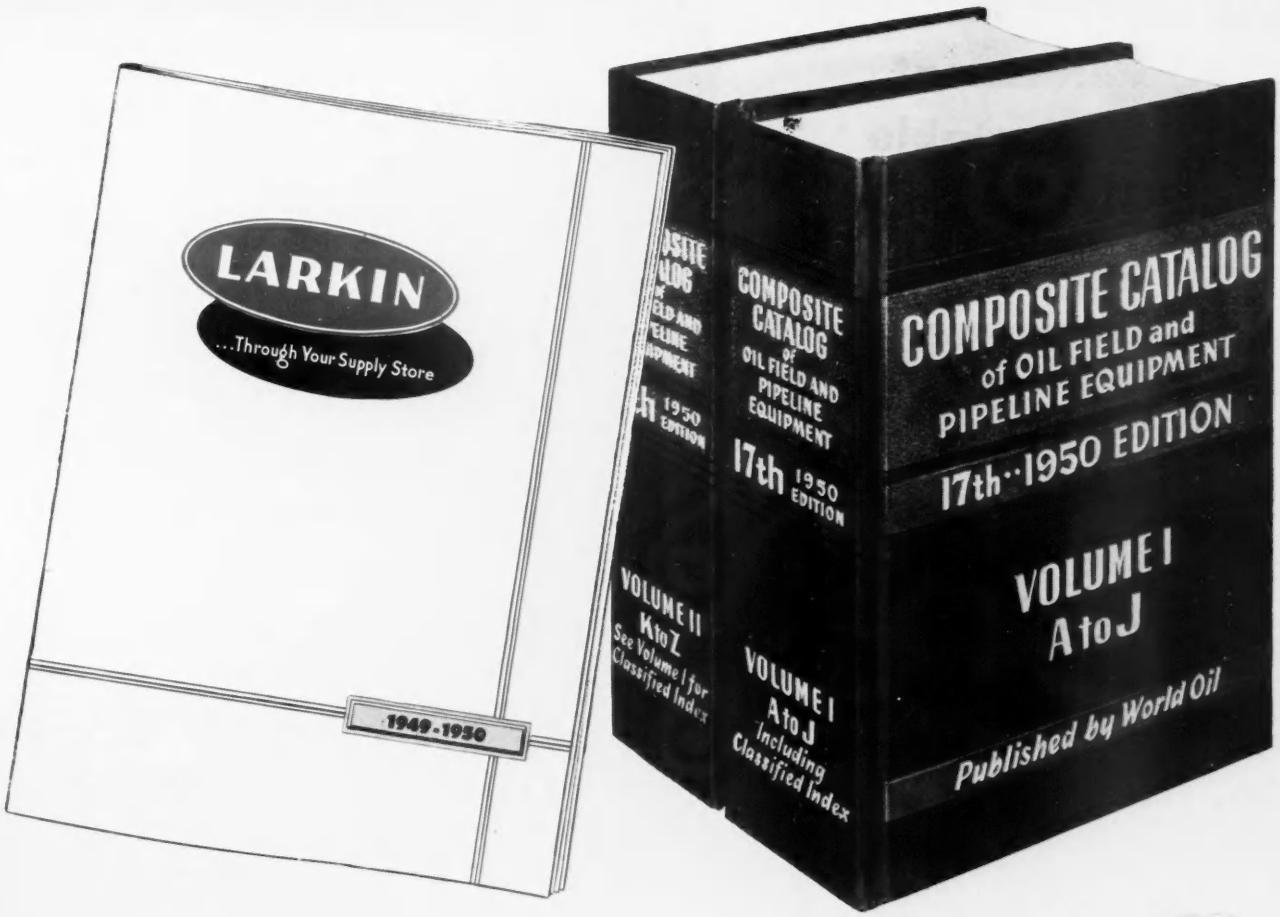
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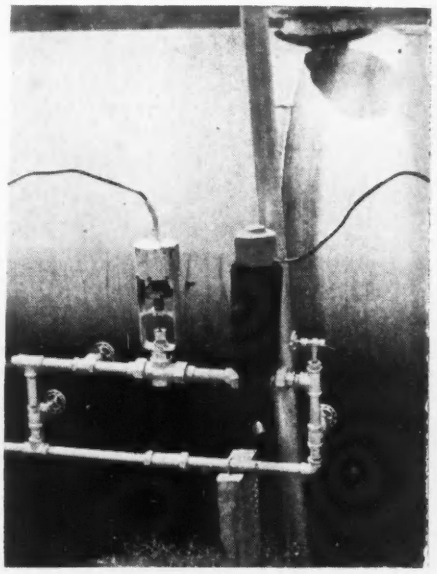
HOW TO—Protect Fuel Regulators

Fuel regulators on treater units in open fields are exposed to accidental derangement by contact from cattle or hogs crowding close to the unit for warmth during inclement weather, and also from meddling by children and others who like to experiment by changing adjustments or forcing the regulator to work prematurely.

One company fashions hinged covers for these regulators, designing them so that they will enclose the moving parts



of the regulator, and using metal heavy enough to withstand considerable strain. The lower portions of both halves of the covers are designed so they will meet below the body of the regulator, and are provided with matching holes so that a padlock may be snapped through them and the device thus firmly fixed in place. Adjustment or change of the regulator setting is possible only to someone having the proper key.

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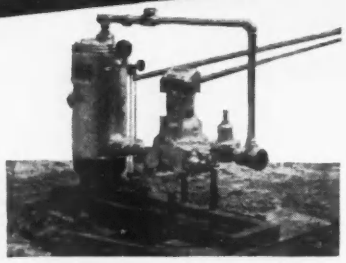
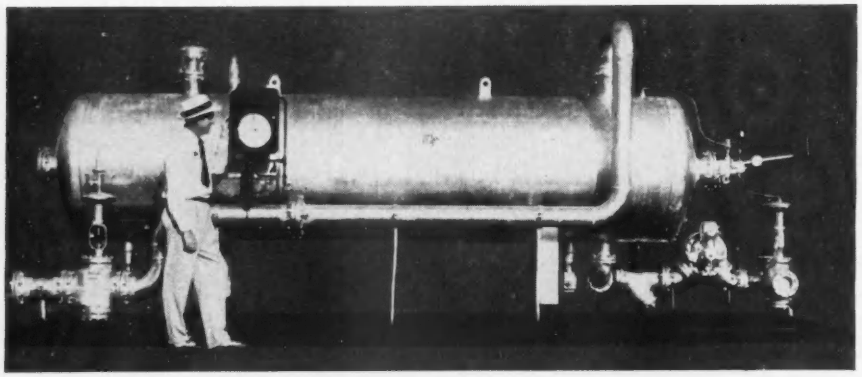


Tom Thumb Model: 8" x 24" x 125# w.p. Designed for handling small stripper wells. Will measure as low as 1/20 gpm.



Rolo No. 2H-4816: 48" x 16' x 230# w.p.—ASI-ASME code labeled. Especially designed for foaming crudes, with 6" fabricated gas run and 4" oil line.

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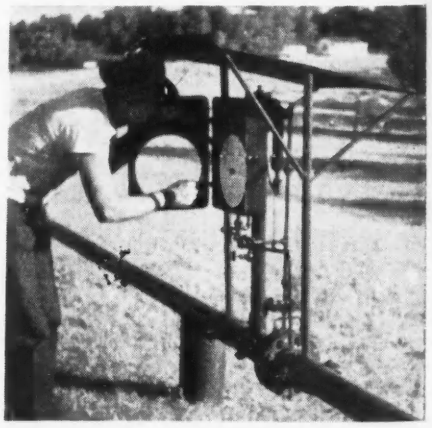
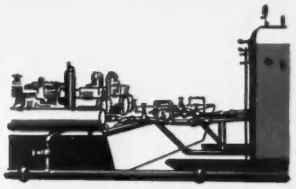
HOW TO— Prevent Weather Damage to Meter

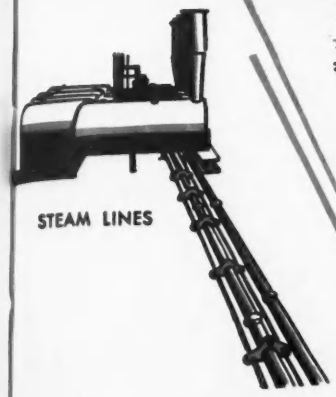
Although made tight, weatherproof meters will sometimes allow rain to enter when it comes from the back in a driving storm. A small shed over the meter will prevent water entering the case and at the same time afford protection during chart changes. When the charts are changed, the new chart must be dry or it will cling to the back plate and not turn with the chart drive. Also



FIELD LINES

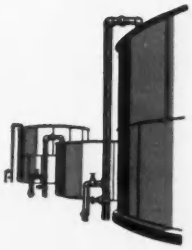


WATER LINES

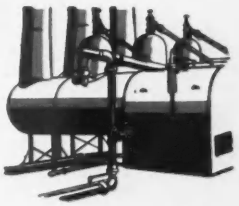


STEAM LINES

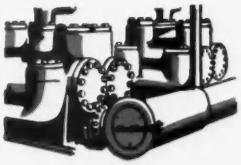
SEPARATORS



TANK BATTERIES



BOILER HEADERS



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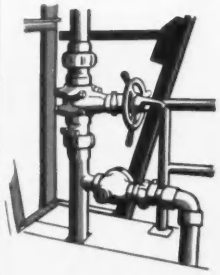
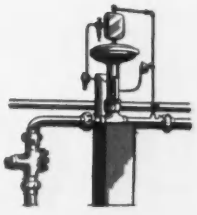


MUD LINES



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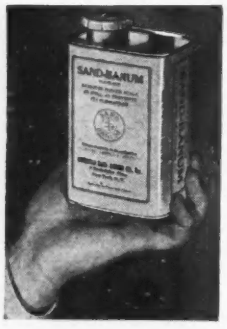

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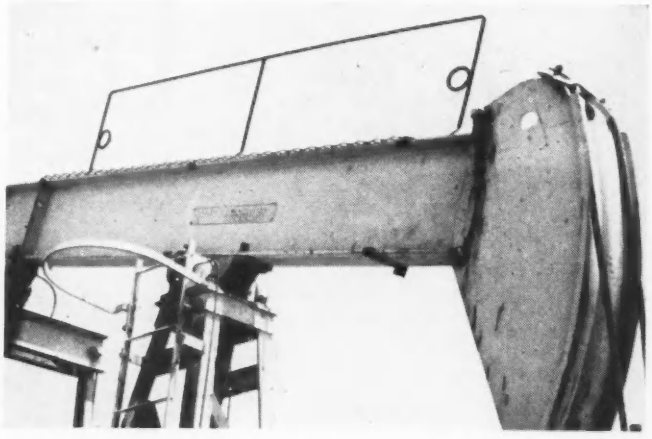
when wells are being tested, the extra roof affords protection from sun and rain for the engineer who must stay by the meter during the test.

Constructed from scrap tank steel, pipe and sucker rod material, the shelter requires only a few minutes of the welder's time. The tank iron is first cut into a three-foot square with the front end curved upward to make more room at the front. The upright pieces of 1¼-inch pipe are welded at an angle to give the roof a slope. Sucker rod material is then used for braces and the whole assembly is welded to clamps which fasten over the four-inch meter run.

HOW TO—Protect Workmen on Beam

As a safeguard against slipping and falling while servicing bearings or otherwise working atop the walking beam of a pumping unit, one company equips its units in the manner illustrated. Along one side of the beam was mounted a low railing made of sucker rod material, the unit being clamped to the upper and lower surfaces of the beam at three points. The clamps are made to hook onto the far side of the beam as shown. The upper surface of the beam was covered with a strip of expanded metal, this material extending nearly the full length of the beam, to make a slip-proof walking surface.



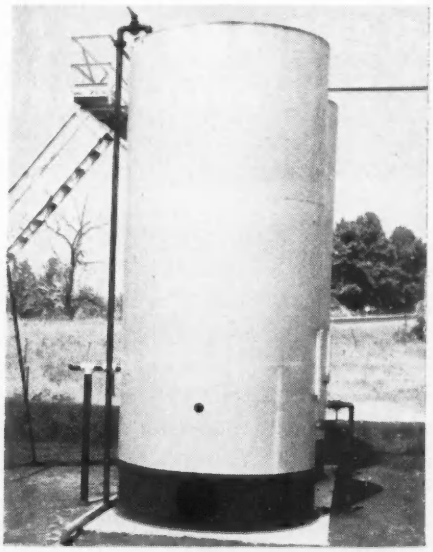
These practices are of particular value, for although work atop the beam may not be required as frequently as on other parts of the unit nearer ground level, it nevertheless constitutes a real hazard.

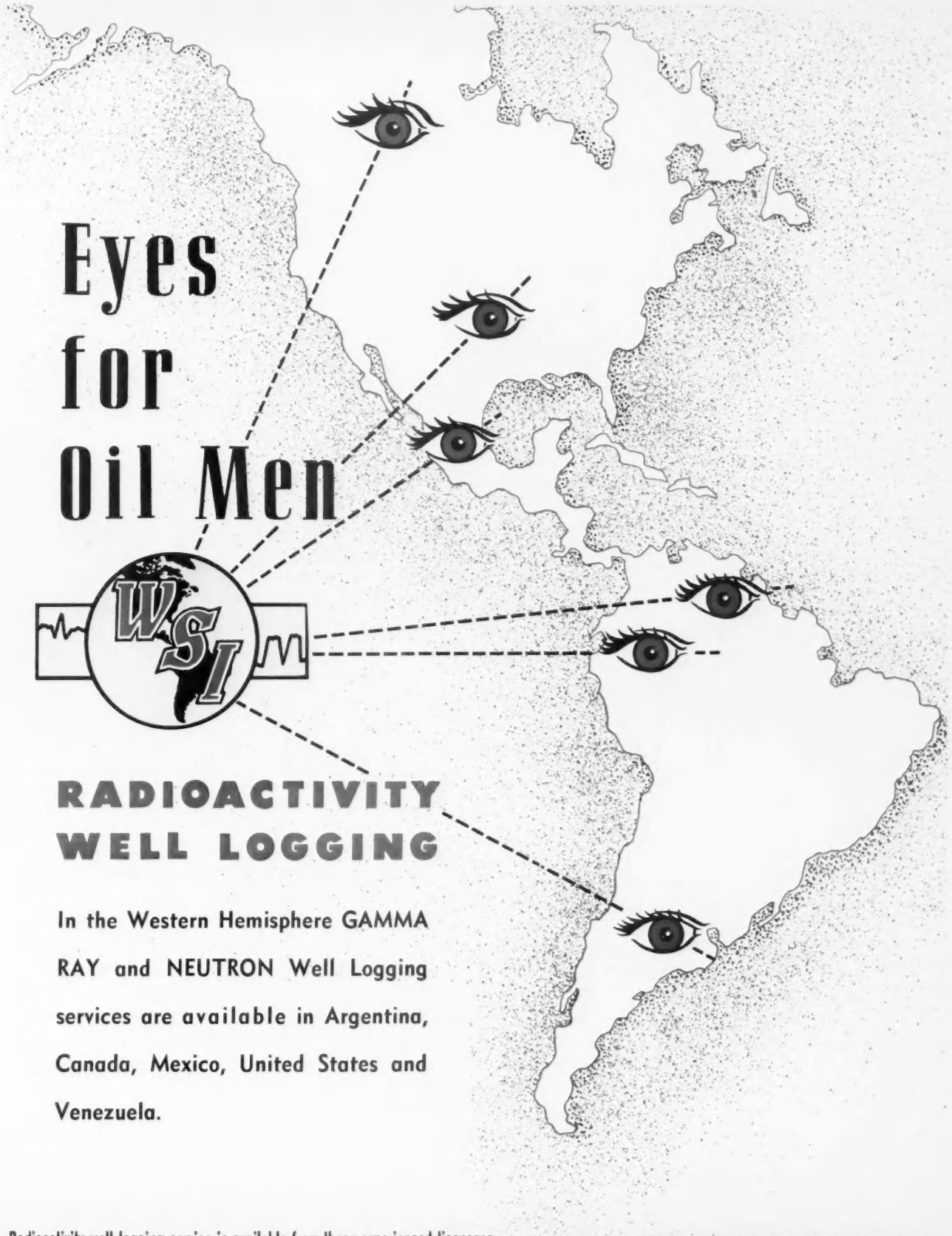
HOW TO—Ventilate Tank Bottoms

When tanks are being set in low creek beds, they are subject to corrosive conditions and danger of floating when water is over the tank dikes. When old tank sections are available, and even when new material is purchased, an extra section may be installed at the bottom of the tanks to keep them free of the corrosive soil and high water.

The tanks are constructed in the usual manner with the extra section welded to the bottom. However, instead of installing the bottom on the concrete platform, it is welded into the bottom section two feet below the weld at the top. The tank cleaning plate is then welded in partly in the bottom section and partly in the top, and the pipe line connection and bleeder lines installed.

With this arrangement, it is not necessary to fill the tanks when high water threatens. The extra height from the ground prevents water from corroding the tank bottoms from the outside.





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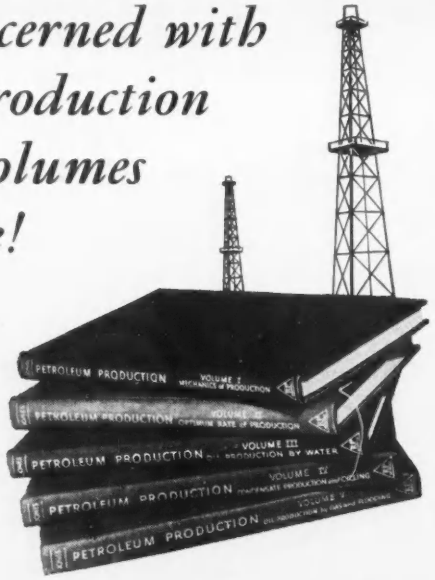

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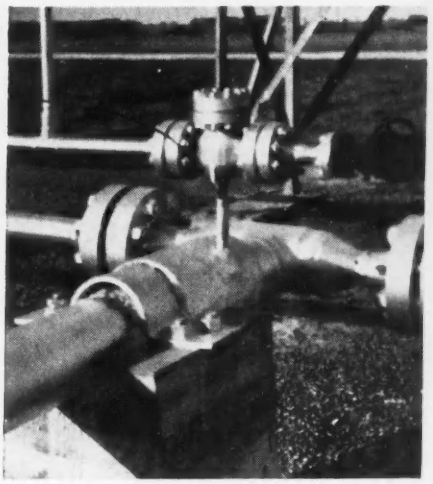
PRODUCTION HINTS

HOW TO—

Insulate Flow Line Thermometer Well

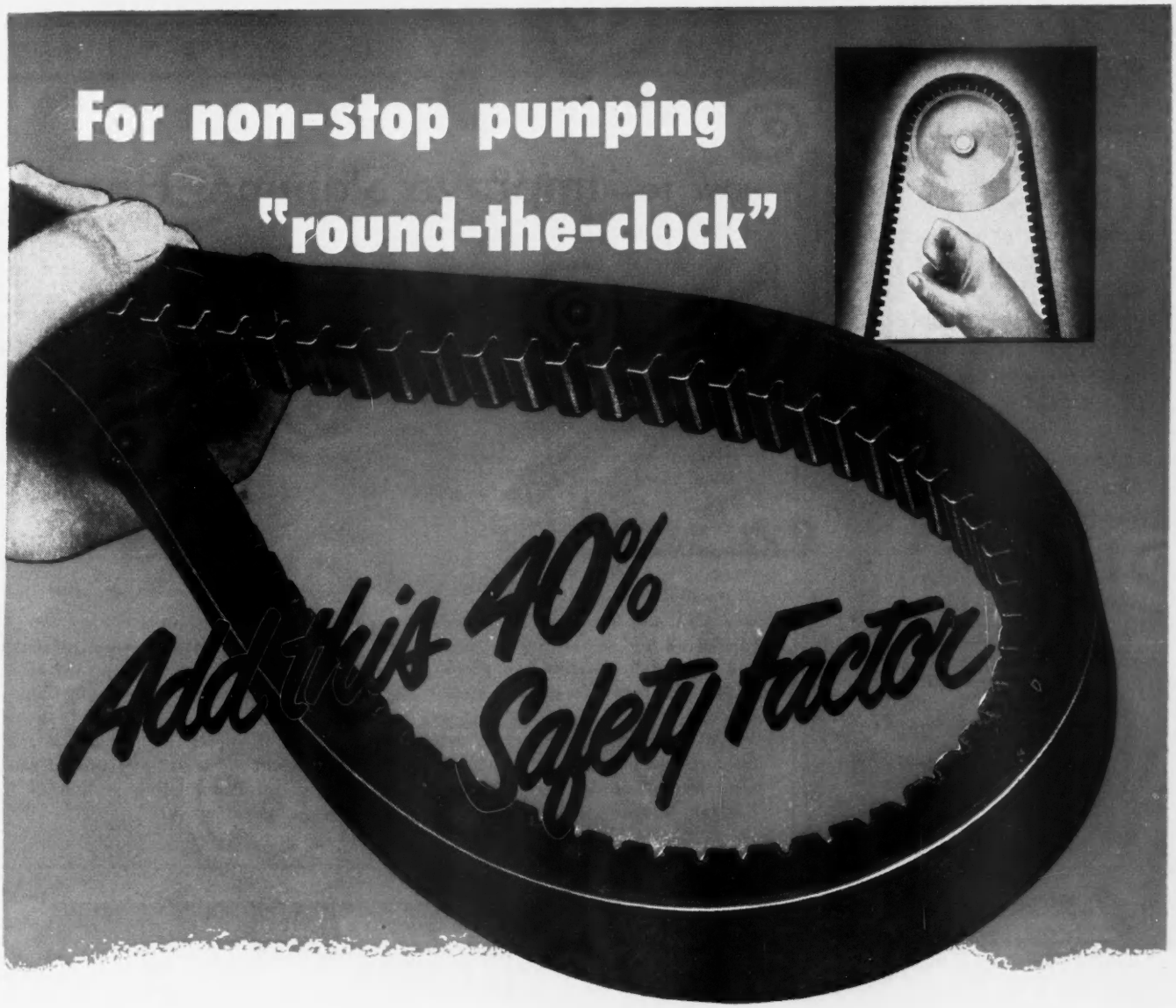
Accurate measurement of gas volumes produced by high-pressure gas wells requires not only orifice meter pressure recordings, but also instantaneous temperature readings. Since slight changes in temperature on large volumes of high pressure gas will make a large difference in the corrected volume, it is necessary to obtain a continuous measurement of line temperature that is as accurate as possible. These measurements are made with a recording orifice meter and a continuous



temperature recorder. Both instruments are mounted on a common bracket near the orifice plate flange in the gas line.

To record temperature readings a thermometer well was attached to the upstream section of gas line. This well, made of one-inch galvanized pipe about ten inches long, was welded to the outside wall of the gas line. The thermometer element was inserted inside the one-inch well which was later filled with oil.

To insure that the temperature readings made were as near as possible the temperature of the gas inside the pipe, a jacket of asbestos insulation was added to the outside of the pipe and thermometer well as shown. The insulation was applied in a plastic form and spread over the area of the pipe in the vicinity of the thermometer well. A coating about two inches thick was applied. By insulating the temperature elements of the recording thermometer, changes in atmospheric temperature had little effect upon the recorded temperature, which was that of the gas in the line.



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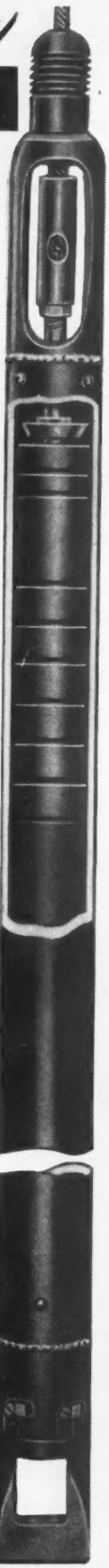

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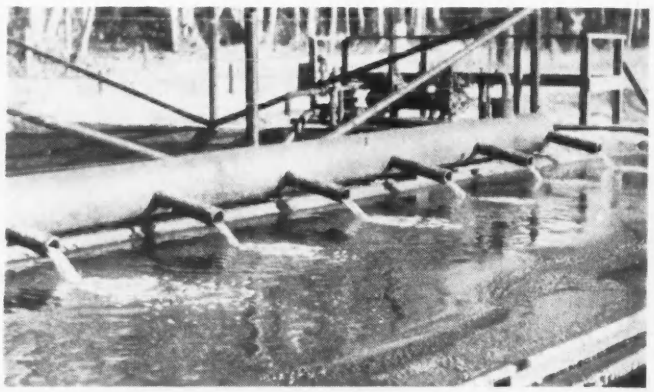
HOW TO—Improve Skimmer Header



With a skimmer feed header fitted with several discharge nipples, the efficiency of the skimming pond at an oil treating plant was increased materially. The method previously employed at this plant made use of only one feed header which discharged directly into the reservoir. When all the liquid plunged into the pond, the force of the discharge carried oil and water below the surface and the small droplets and globules of oil did not break freely and rise to the top.

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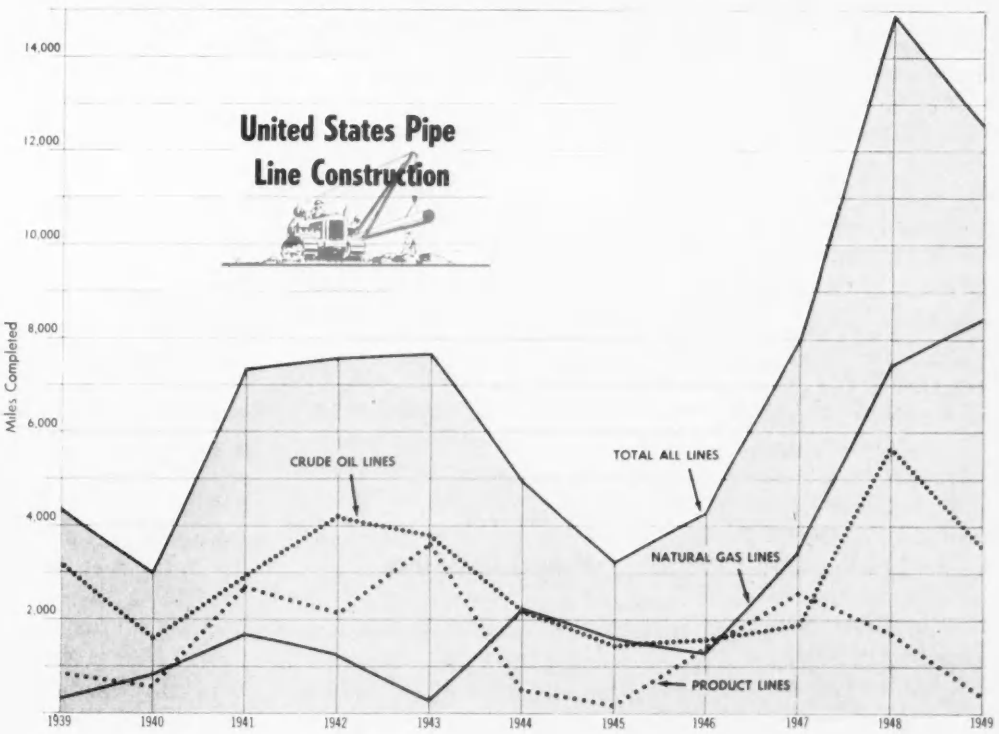
PIPE LINE CONSTRUCTION

Due for Best Year in 1950

PIPE line projects under way at the beginning of 1950 combined with others planned and authorized indicate that 1950 will be the greatest year in pipe line construction history. Should this country's steel supply continue at a relatively high level during the coming year, not only will there be an unprecedented number of miles of pipe placed in the ground, but the expenditure for construction will also set a new record.

Long interstate gas lines dominate the construction outlook, and many thousands of miles have been authorized, planned or now are under way. Most of these lines are 20-inch and larger, which will account for the increased expenditure. Figures compiled by monthly surveys to contractors pipe line companies, the Federal Power Commission and other agencies show that at the beginning of 1950 an unprecedented total of 26,499 miles of crude, natural gas and products pipe lines are under



YEAR	MILES OF NEW PIPE LINE PLACED IN OPERATION*				MILES OF LINE BUILDING OR AUTHORIZED AT YEAR END†			
	Oil	Product	Gas	Total	Oil	Product	Gas	Total
1949	3,634	437	8,493	12,564	2,663	2,055	21,740	26,499
1948	5,669	1,738	7,414	14,821	4,779	42	15,323	20,144
1947	1,876	2,598	3,479	7,953	2,715	1,386	9,790	13,891
1946	1,610	1,404	1,271	4,285	2,099	2,638	4,771	9,508
1945	1,470	143	1,598	3,211	831	882	248	1,961
1944	2,219	518	2,224	4,961	112	....	286	398
1943	3,795	3,614	262	7,671	848	....	1,423	2,371
1942	4,200	2,100	1,250	7,550	1,147	428	140	1,715
1941	2,900	2,700	1,700	7,300	322	....	446	768
1940	1,615	575	810	8,000	457	450	243	1,150
1939	3,155	840	305	4,300	460	589	171	1,220

* Includes all lines completed during the year. † Mileage on all types of pipe lines on which construction was still underway at end of year, plus mileage of new lines authorized or planned.

construction, definitely planned, or authorized. It should be pointed out, however, that since most of these lines are long, interstate gas lines scheduled for completion in 1952 and 1953, not all of this pipe will be laid during the year. Based on previous studies of pipe line construction statistics, it is anticipated that possibly 15,000 miles of line will be laid in 1950.

During the past year, the nation's underground steel arteries took another leap in their growth as the number of miles of crude, natural gas and products pipe lines completed came to a total of 12,564 miles. Pipe line construction in 1948 set an all-time high of 14,821 miles of pipe laid. WORLD OIL's estimate in February, 1949, on the year's construction program was 13,000 miles, or 436 miles over the 12,564 miles actually completed.

Compared to 1948 construction figures, actual line placed in the ground during 1949 was 2257 miles less. This difference can be justified by a look at the facts. The high demand for oil leveled off in the spring of 1949 after a relatively light winter, and therefore most of the immediate needs for crude transportation was satisfied. Only 3634 miles of crude lines were laid during the past year compared with 5669 for the previous year.

Pipe Sizes of Lines Laid in U. S. During 1949

Nominal Pipe Size, Inches	Miles Completed in 1949	Percent of Year's Total
4	547	4.35
6	602	4.79
8	998	7.94
10	974	7.75
12	1067	8.49
14	329	2.62
16	527	4.20
18	244	1.94
20	953	7.59
22	1169	9.30
24	2225	17.71
26	1579	12.57
30 and Over	1350	10.75
	12,564	100.00%

Crude Lines

The Basin and Ozark Pipe Line systems, together comprising the largest crude oil pipe line ever built by private capital in the U. S., was formally placed in operation in July, 1949. The line extends from Jal, N. M., to Cushing, Okla., and to Wood River and Patoka, Ill. It consists of 20-, 22- and 24-inch diameter pipe. The line was originally started in November, 1947. The Basin System, built by The Texas Pipe Line Company, is owned and will be operated on an undivided interest basis by Texas, together with Shell Pipe Line Corporation, Sinclair Refining Company and Empire Pipeline Company. The Ozark System, built by Shell Pipe Line Corporation, is jointly owned by Shell and The Texas Pipe Line Company, while the 54-mile extension to Patoka is owned by The Texas Pipe Line Company.

The longest crude line under way is that of the Mid-Valley Pipeline Company. This is a 1000-mile line of 22-inch diameter pipe, extending from the vicinity of Longview, Texas, up to Lima, Ohio. It is to have a capacity of 150,000 barrels per day to Cincinnati, Ohio, and 140,000 barrels per day to Lima. Most of the contracts on this line have been let, and it is scheduled for completion early in 1951.

Products Lines

Construction of only 437 miles of products lines in 1949 was a definite slump alongside the 1948 figure of 1738 miles. There was no outstanding products line construction during the past year, but the tempo should pick up when planned products lines get into full swing. The largest single products line now under construction is the Great Lakes Pipe Line Company's 976-mile project from Ponca City, Okla., to Omaha, Neb. The main line will be of 12-inch pipe, while an eight-inch line will connect Tulsa and Cushing, Okla. Total cost of the project is estimated at $37½ million. Most of the contracts have been let and construction got under way the later part of 1949.

Natural Gas Lines

A record high of 8493 miles of line completed was established for natural gas carriers in 1949. This figure compares with 7414 miles of gas lines laid in the previous year, which was more than double the number of miles laid during the year before. The acceleration of natural gas line construction actually started in 1946 when coal strikes began to plague the heavily-populated Eastern states. In the four years following the war, 20,657 miles of natural gas lines have been laid, mostly to transport gas to the East and Midwest. Even in the light of this all-time high in construction completed, natural gas lines planned, authorized or now under way totals 21,740 miles, exceeding all previous figures. However, the bulk of this total is made up of long interstate lines, completion of which are scheduled in the next two or three years.

The longest single natural gas line completed during the year was that of the Michigan-Wisconsin Pipe Line Company. The line extends from Hansford County, Texas, to Mecosta County, Michigan and Green Bay, Wis., and includes 1170 miles of 24-inch diameter pipe and 11 miles of 18-inch pipe, plus 310 miles of small feeder lines varying in size from two-inch to 14-inch. Estimated cost of this line and compressor stations was over $90 million.

Approximately 550 miles of 30-inch diameter pipe was laid during 1949 on the Transcontinental Gas Pipe Line Corporation's largest and longest line in history. When completed, the line will extend from the lower Texas Rio Grande Valley to 132nd Street, New York City, a total of 1849 miles. Estimated costs are $243 million. Contracts for the entire eastern section of the line beginning at Eunice, La., have been let, while contracts on the southwestern section through Texas are pending. Ultimate capacity of the line will be 504 million cubic feet daily. It is scheduled for completion early in 1951.

Louisiana-Toronto Line

Possibly the outstanding natural gas line proposed in 1949 was the New Orleans-to-Canada carrier to be constructed by the American Gas Transit Corporation. To be financed 90 percent by Canadian capital, this line would link the gas reserves of the Louisiana Gulf Coast with Toronto, Canada, 1500 miles distant. Estimated cost of such a project is $300 million. Land and gas contracts are being purchased for American Gas Transit.

Unusual because it will be the largest line in diameter when completed, is Pacific Gas & Electric Company's 34-inch line under construction from Needles, Calif., to the company's Milpitas, Calif., terminal, a total of 506 miles. Scheduled for completion in 1952, initial capacity of the line will be 150 million cubic feet daily, with an ultimate capacity of 400 million cubic feet daily. Estimated cost is $55,519,000.

New manufacturing techniques developed to fabricate the large 30- and 31-inch pipe for the Trans-Arabian pipe line have made possible the mass production of large-diameter pipe required for the long gas lines planned. In addition to the plants already making large diameter pipe by rolling and welding flat steel plate, two large plants are under construction and will be in operation during 1950. Both plants, located in the Houston area, will have a capacity of about 385,000 tons of pipe yearly.

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Pipe Line Activity in 1949

Arkansas

Arkansas Western Gas Company completed 17.5 miles of 8-inch natural gas loop line from Madison, Washington County, to Fayetteville. Worth James Construction Company, Little Rock, contractor.

Fort Smith Gas Corporation has applied to Arkansas Public Service Commission for permission to lay 6 miles of 4-inch natural gas line connecting Pocahontas, Ark., to the Mississippi River Fuel Corporation's 22-inch line.

California

Coast Counties Gas & Electric Company is constructing 10 miles of 10-inch natural gas line between Watsonville and Gilroy. M. G. M. Construction Company, Concord, contractor.

Pacific Gas & Electric Company completed 19 miles of 30-inch natural gas line between Irvington and San Leandro, and 10 miles of 24-inch gas line between San Leandro and Oakland. Bechtel-Price-Conyes, San Francisco, contractors.

Pacific Gas & Electric Company is laying a 17.5-mile, 12-inch gas line from Davis to North Sacramento.

Pacific Gas & Electric Company has planned a 12.5-mile, 6-inch gas line connecting Dunnigan Hills field, Yolo County, to the Woodland-Davis-Sacramento line.

Pacific Gas & Electric Company completed 12 miles of 16-inch gas loop line between Rio Vista field and Napa.

Pacific Gas & Electric Company completed a 6-mile, 12-inch natural gas line connecting Petuluma with the existing line at Stoney Point. M. G. M. Construction Company, Concord, contractor.

Pacific Gas & Electric Company also completed 6.5 miles of 4- and 6-inch gas gathering line in Durham field, Butte County. M. G. M. Construction Company, Concord, contractor.

Pacific Gas & Electric Company is building 506 miles of 34-inch natural gas line connecting the company's Milpitas terminal to El Paso's line at Needles. Line is the largest diameter ever authorized for natural gas by FPC. Bechtel-Price-Conyes, San Francisco, contractors.

Richfield Oil Corporation is planning construction of a 40-mile, 10-inch crude oil line from Cuyama Valley field to Newhall.

Richfield Oil Corporation is constructing 60 miles of 14-inch crude oil line from Newhall to Wilmington. Completion is scheduled for January, 1950. Alex Robertson Company, Bakersfield, contractor.

Richfield Oil Company completed 22 miles of 14-inch crude line from Newhall to Burbank. J. E. Young Pipe Line Contractor, Inc., Los Angeles, contractor.

Richfield Oil Corporation completed 30 miles of 8-inch crude line connecting the San Joaquin-Maricopa pipe line with the Cuyama Valley field. Pacific Pipe Line & Engineers, Ltd., Los Angeles, contractor.

San Diego Gas and Electric Company completed 51 miles of 16-inch natural gas line from Southern Counties Gas' 16-inch line at Rainbow, San Diego County, to Mission Valley, San Diego County. Part of 85-mile joint project with Southern Counties Gas Company of California from Moreno to San Diego. Utility Construction Company, South Gate, and N. P. Van Valkenburgh Company, South Gate, contractors.

Southern Counties Gas Company of California completed a 12-mile, 20-inch gas line from Ventura to Carpinteria. J. E. Young Pipe Line Contractor, Inc., Los Angeles, contractor.

Southern Counties Gas Company of California completed 35 miles of 16-inch natural gas line from the Tex.-to-Calif. line at Moreno to San Diego County line. Part of 85-mile joint project with San Diego Gas and Electric Company. J. E. Young Pipe Line Contractor, Inc., Los Angeles, contractor.

Standard Oil Company of California completed 6 miles of 6-inch gas line connecting the line serving El Segundo refinery to Montebello field. Line replaces a 30-year old line which will be abandoned. Alex Robertson Company, Bakersfield, contractor.

Standard Oil Company of California has also completed 10 miles of 10-inch crude line from Wilmington to the existing line to Standard's El Segundo refinery. Line to move the increasing amount of crude oil being produced in the Los Angeles Basin area. Pacific Pipe Line and Engineers, Ltd., Los Angeles, contractor.

Colorado

Colorado-Wyoming Gas Company is planning construction of 41 miles of natural gas loop line on the Denver-to-Cheyenne line.

Connecticut

Northeastern Gas Transmission Company is planning a 511-mile, 20-inch natural gas line to supply New England area from the proposed TGT and Transcontinental Gas Pipe Line systems.

Illinois

The Buckeye Pipe Line Company completed 21 miles of 6-inch products line from The Texas Company's refinery at Lawrenceville to the company's pumping station at Robinson. H. L. Gentry Construction Company, Jackson, Mich., contractor.

Chicago District Pipe Line Company plans a 41-mile, 24-inch gas line from Joliet Township to Chicago south city limits.

Egyptian Natural Gas Company is planning 40 miles of 8-inch natural gas line from Norris City to Mount Vernon, and 40 miles of 6-inch gas line from Mount Vernon to Centralia and Salem.

Illinois Northern Utilities Company completed 9 miles of 4-inch natural gas line from company's Oregon regulating station to Natural Gas Pipe Line Company of America's meter station. Midwestern Contractors, Inc., Chicago, contractor.

Mississippi River Fuel Corporation completed 9.5 miles of 20- and 24-inch gas line from Granite City to East Saint Louis. Sheehan Pipe Line Construction Company, Tulsa, Okla., contractor.

Peoples Light Gas and Coke Company plans a 7-mile, 24-inch gas line connecting company's Calumet gas plant to proposed Chicago District Pipe Line Company's Calumet line.

Public Service Company of Northern Illinois completed a 6-mile, 12-inch natural gas line from Wedron to Ottawa. Midwestern Contractors, Inc., Chicago, contractor.

Sohio Pipe Line Company completed 40 miles of 2-inch to 6-inch crude gathering lines in Ill., Ind., and Ken. Somerville Construction Company, Ada, Mich., contractor.

The Texas-Empire Pipe Line Company completed 183 miles of 18-inch crude line, Patoka to Wilmington; and 42 miles of 16-inch loop from Wilmington towards East Chicago, Ind. Anderson Bros. Corporation, Houston and H. C. Price Company, Bartlesville, Okla., contractors.

The Texas Pipe Line Company completed a 55-mile, 22-inch crude oil line from Wood River to Patoka. Sheehan Pipe Line Construction Company, Tulsa, contractor.

Indiana

The Buckeye Pipe Line Company is constructing 140 miles of 8-inch products line from Speedway City to Lima, Ohio. H. L. Gentry Construction Company, Jackson, Mich., contractor.

City of Indianapolis is planning 55 miles of 16-inch natural gas line from the city's plant to Texas Eastern Transmission Company's Ind. line.

Panhandle Eastern Pipe Line Company has planned for 1950 construction a 25-mile, 16-inch gas line from the company's transmission line to Citizens Gas & Coke Utility in Indianapolis.

Texas Gas Transmission Corporation has FPC permission to build a 7.5-mile, 8-inch natural gas line from TETCO's "Big Inch" line to Mitchell.

Iowa

Iowa-Illinois Gas & Electric Company completed 25 miles of 4-inch gas line from Oskaloosa to Ottumwa. T. & L. Construction Company, Centralia, Ill., contractor.

Iowa-Illinois Gas and Electric Company completed an 11-mile, 10-inch natural gas line in the vicinity of Davenport. Midwestern Contractors, Inc., Chicago, contractor.

Kansas

Cities Service Gas Company is planning 29 miles of 16-inch natural gas line from Wichita to Newton.

Cities Service Gas Company has application before FPC for the construction of 42.6 miles of natural gas line in the Wichita-Newton area. Plan includes abandoning 127.3 miles of pipe line.

Cities Service Gas Company completed 26 miles of 4-, 6-, 12-inch gas gathering system in Hugoton field. Knupp Construction Company, Inc., Great Bend, contractor.

Cities Service Gas Company has completed its 405-mile, 26-inch gas line from Hugoton field to Kansas City, Mo., more than 100 miles of which was laid in 1948. Ray L. Smith & Son, Inc., El Dorado, contractor for western end. R. H. Fulton & Company, Lubbock, Texas, contractor for center section from Newton to Ottawa; Midwestern Constructors, Tulsa, contractor for northern end.

Colorado Interstate Gas Company completed 38 miles of 20-inch loop lines on the Hugoton to Denver natural gas line. Cheek Construction Company, Inc., Ulysses, contractor.

Colorado Interstate Gas Company also completed 15.7 miles of 20-inch natural gas loop line at the Arkansas River crossing near Lakin. R. H. Fulton & Company, Lubbock, contractor.

The Cooperative Refinery Association completed 45 miles of 4- and 6-inch crude line between Plainville and Phillipsburg. W. E. Bolt Construction Company, Jenks, Okla., contractor.

The Kansas Power & Light Company completed 146 miles of 20- and 22-inch natural gas line from Ulysses to Pratt. M. E. White & Company, McPherson, contractor.

Kansas-Colorado Utilities, Inc., completed 21 miles of 4- and 6-inch gas lateral line and 9 miles of gathering line between Kendall and Syracuse. S. C. Patterson, Phillipsburg, contractor.

Kansas-Nebraska Natural Gas Company, Inc., has been granted FPC authority to build a 301-mile natural gas line in Kansas and Neb.

Northern Natural Gas Company has applied to FPC for permission to build 442 miles of 26-inch and 155 miles of 20-inch loop line between the Texas Panhandle and Minn. Contracts have been let as follows: 221 miles of 26-inch and 115 miles of 20-inch (Garden City to Bushton) to R. H. Fulton & Company, Lubbock, Texas; 109 miles of 26-inch to Midwestern Constructors, Inc., Tulsa; 112 miles of 26-inch to R. B. Potashnick, Cape Girardeau, Mo.

Northern Natural Gas Company is planning 20 miles of 20-inch and 3.7 miles of 24-inch natural gas line connecting Sublette to Plains Natural Gas Company's system in Okla. Panhandle. R. H. Fulton & Company, Lubbock, Texas, contractor.

Northern Natural Gas Company completed 46 miles of 4-, 6-, 8-inch gas gathering lines in Hugoton field. Knupp Construction Company, Inc., Great Bend, contractor.

Northern Natural Gas Company has completed 62 miles of 20- and 24-inch, and is building 44 miles of 4- through 12-inch gas gathering lines in the vicinity of Garden City. R. H. Fulton & Company, Lubbock, contractor.

Northern Natural Gas Company has completed 137.2 miles of 20- and 24-inch gas line in Kansas, Neb., Iowa, and Minn. Eastern Construction Company, Inc., Dallas, contractor for 56.4 miles of 24-inch and 21.1 miles of 20-inch; G. G. Griffis Construction Company, Tulsa, Okla., contractor for 59.7 miles of 24-inch.

Stanolind Oil & Gas Company completed 137 miles of 4- through 22-inch gas gathering system in Hugoton field near Ulysses, Cimarron River crossing included. Deaton & Sons, Inc., Odessa, Texas, contractor.

Kentucky

Central Kentucky Natural Gas Company completed 23 miles of 12-inch loop from Menifee to Mt. Sterling, and 2.3 miles of 16-inch transmission line from TGT's line at South Means to Menifee. Williams-Austin Company, Pittsburgh, Penn., contractor.

Louisiana

The American Gas Transit Company has proposed a 1500-mile, 30-inch line carrying natural gas from the New Orleans area to Toronto, Canada.

Atlantic Gulf Gas Company (Sub. United Gas Corporation) has an application before FPC for permission to lay 1731 miles of 2- to 30-inch line from Eastern Louisiana to Georgetown, S. C.

T. R. Bryan Associates completed 10 miles of 4-inch crude line in the vicinity of Opelousas. Latex Construction Company, Houston, contractor.

The California Company completed 40 miles of 6- and 8-inch crude line in the Ruston

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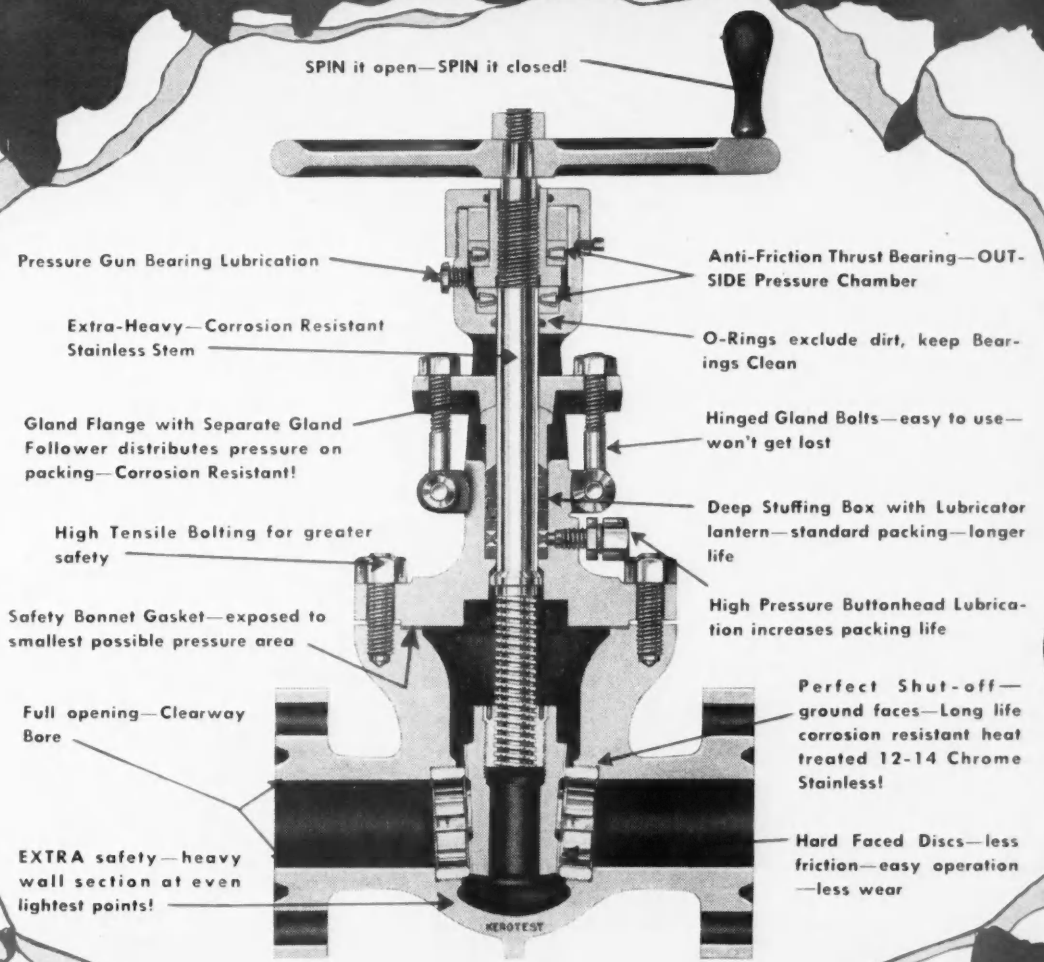
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vicinity. Latex Construction Company, Houston, contractor.

Interstate Natural Gas Company completed 29 miles of 16-, 20-, 22-inch gas line west of Baton Rouge. Latex Construction Company, Houston, contractor.

Interstate Oil Pipe Line Company completed a 12-mile, 8-inch crude line near La Rose, Lafourche Parish. Latex Construction Company, Houston, contractor.

Mississippi River Fuel Corporation completed 219 miles of 24-inch gas loops from Monroe field to St. Louis, Mo. R. B. Potashnick, Cape Girardeau, Mo., contractor.

Skelly Oil Company completed 8 miles of 3- and 8-inch gas gathering system in Logansport field, De Soto Parish. Wood Engineering & Construction Company, Arp, Texas, contractor.

Trunkline Gas Supply Company has an amended application before FPC for permission to build 740 miles of 26-inch main line from Longville to Panhandle Eastern Pipeline Company's Tuscola, Ill., station, and 810 miles of lateral supply lines to Texas and La. Gulf Coast gas fields.

United Gas Pipe Line Company has FPC authority to construct a 105.6-mile, 20-inch gas loop on the Carthage-Sterlington line. Loop will extend from De Soto Parish near the Texas-La. line to a point near Monroe. O. C. Whitaker Company, Fort Worth, contractor.

United Gas Pipe Line Company is planning a 90-mile, 16-inch gas line connecting New Orleans to the Mississippi River Delta fields.

United Gas Pipe Line Company completed 12 miles of 6-inch pipe from Church Point to Opelousas. Murray Construction Company, Shreveport, contractor.

United Gas Pipe Line Company has applied for FPC authorization to build 224 miles of pipe line from southeastern Louisiana fields to western end of Atlantic Gulf Gas Company's proposed La.-to-S. C. line.

United Gas Pipe Line Company has FPC permission for construction of a 26-mile line to connect four shut-in gas fields in southwestern La. with company's system near Port Arthur, Texas. United will purchase shut-in production from Magnolia Petroleum Company.

Maine

Portland Pipe Line Corporation has scheduled for 1950 construction 165 miles of 18-inch crude line from South Portland to the U. S.-Canada border at North Troy, Vt. Oklahoma Contracting Corporation, Dallas, contractor for 85 miles on southern end; Associated Pipe Line Contractors, Inc., Houston, contractor for remaining 80 miles to the border. A 70-mile stretch from the border to Montreal will be built by the Montreal Pipe Line Company.

Maryland

Consolidated Gas, Electric Light & Power Company completed 14 miles of 26-inch natural gas line in the vicinity of Baltimore. Pipe Line Construction & Drilling Company, Camphill, Penn., contractor.

Michigan

Dow Chemical Company completed 11 miles of 8-inch gas line connecting Ludington to Pentwater field. Somerville Construction Company, Ada, contractor.

Dow Chemical Company completed 56 miles of 8-inch gas line from Beaver Creek field, Crawford County, to Loomis. Somerville Construction Company, Ada, contractor.

Haven Gas Cmpany completed 7 miles of 4-inch transmission and gathering lines between Newark field, Gratiot County, and the Consumers Power Company's 4-inch line. Welded Construction Company, Mount Pleasant, contractor.

Michigan Consolidated Gas Company proposes construction of a 21-mile, 24-inch gas line from Austin storage field to Reed City storage field.

Michigan Consolidated Gas Company completed 6 miles of 22-inch gas line from Jenison to Grand Rapids. Somerville Construction Company, Ada, contractor.

Michigan Consolidated Gas Company completed 22 miles of 12-inch natural gas line from Ann Arbor to Milford. Somerville Construction Company, Ada, contractor.

Michigan Consolidated Gas Company also completed 15 miles of 20-inch gas line between Goodwell field, Newaygo County, to Austin field, Mecosta County. Somerville Construction Company, Ada, contractor.

Michigan Gas Storage Company completed 75 miles of 20-inch line running from Panhandle Eastern Pipe Line Company's Chelsea terminal to Lainsburg, with 12- and 20-inch laterals running in to Lansing. This is part of a 150-mile, 20-inch line between Panhandle's Chelsea terminal and Winterfield and Cranberry Lake Storage fields. The middle portion, 51 miles, from Lainsburg to Mount Pleasant, is scheduled for 1950 construction, and the northern end for 1951. E. J. Mahoney Construction Company, Mount Pleasant, contractor.

National Utilities Company of Michigan is constructing 50 miles of 4- through 10-inch lateral lines linking Grand Haven, Allegan, South Haven, Benton Harbor, and Coldwater with the Mich.-Wis. 24-inch line. Mahoney Contracting Company, Mount Pleasant, contractor.

Simrall Pipe Line Company completed 8 miles of 6-inch crude line from Rosebush field to Mount Pleasant. Somerville Construction Company, Ada, contractor.

Simrall Pipe Line Corporation completed 10 miels of 4-inch and 32 miles of 6-inch crude line between Pentwater field and Woodville. Somerville Construction Company, Ada, contractor.

Mississippi

Gulf Refining Company (Pipe Line Division) plans construction of a 200-mile, 16-inch crude line from the Heidelberg-Eucutta district of Jasper County to Mobile, Ala. Line would run via Baxterville field.

Southern Natural Gas Company proposes to lay approximately 803 miles of natural gas line from Gwinville field. This would include 275 miles of 18-inch from Gwinville to Marvyn, Ala., 221 miles of 16-inch from Marvyn to Aiken, S. C., with loops and connecting lines in Texas, La., Miss., Ga., and S. C.

Southern Natural Gas Company has FPC approval for the construction of 31.3 miles of 10-inch loop on Montgomery, Ala., branch. 6.8 miles of 6-inch loop on Meridian branch; 7.4 miles of 4-inch extension of Ala. branch.

South Mississippi Electric Power Association plans a 10-mile natural gas line between Baxterville field and Hub field.

United Gas Pipe Line Company completed 90 miles of 20-inch line between Mobile Junction and Baxterville field, and 9.5 miles of gathering lines in the field. O. C. Whitaker Company, Fort Worth, Texas, contractor.

Missouri

Missouri Utilities Company completed 6 miles of 6-inch gas line from Texas Eastern line near Illmo to Cape Girardeau. Mid-States Construction Company, Mount Vernon, contractor.

Stanolind Pipe Line Company completed 64 miles of 12-inch crude loops on Company's LaPlate-Wood River line. Sheehan Pipe Line Company, Tulsa, contractor.

Montana

Interstate Oil Pipe Line Company completed a 67-mile, 12-inch crude line from Elk Basin field, Carbon County, to Billings and Laurel. Edmonds Construction Company, Cody, Wyo., contractor.

Montana-Dakota Utilities Company completed a 21-mile gas line from Utopia field, Liberty County, to Company's Telstad Station, Toole County.

The Montana Power Company plans construction of an 83-mile, 12-inch gas line from Butte to Bozeman.

Nebraska

Nebraska City Utilities completed 23.5 miles of 4-inch gas line from Otoe to Nebraska City. D. J. Hines, Hays, Kansas, contractor.

Ohio Oil Company plans a 20-mile line from Gurley field, Cheyenne County, to Stanolind's Wyo.-Mo. line.

New Jersey

County Gas Company has FPC authorization to build 11.4 miles of 6-inch natural gas line from Texas Eastern Transmission system near Perth Amboy to company's system near Keyport.

Jersey Central Power & Light Company has permission from FPC for the construction of a 39.4-mile, 10-inch gas line from Texas Eastern Transmission system at Bound Brook to company's gas manufacturing plant at Long Branch.

South Jersey Gas Company has applied to FPC for authorization to construct a 77-mile gas line from Transcontinental's lateral near Camden to Atlantic City, with laterals to Glassboro, Bridgeton, Vineland and Estelville areas.

New Mexico

El Paso Natural Gas Company has an application before FPC to construct 93.1 miles of gas line to supply gas to Alamogordo, White Sands Proving Ground, Holloman Air Base, N. M., and Willcox, Ariz.

El Paso Natural Gas Company completed 18 miles of 16-inch line from TXL field, Ector County, to Keystone field, Winkler County. Built by company crews.

El Paso Natural Gas Company plans construction of a 721-mile project including 451 miles of 26-inch main line from the San Juan Basin to connect with its 26-inch line to Needles, Calif.; 95.5 miles of feeder lines; and 174.4 miles of branch lines serving Winslow, Flagstaff, Williams, Seligman, Prescott and Kingman.

El Paso Natural Gas Company is constructing 247 miles of 26- and 30-inch loops on its Eunice to Blythe, Ariz., line; 102 miles of 26-inch and 17 miles of 30-inch between Gila station and Needles, Calif.; 95 miles of 24-inch feeder line from company's Keystone station to Benedum field, Upton County, Texas have been completed.

Magnolia Pipe Line Company completed 13 miles of 8-inch crude line from Cross Roads field and Betenbaugh area, Lea County, to Stanolind's Cap Rock-Slaughter 8-inch line. C. L. Rogers Construction Company, Inc., Wichita Falls, Texas, contractor.

Shell Pipe Line Corporation completed 41 miles of 14-inch crude line from Hobbs to the Basin Pipe Line system at Jal. Latex Construction Company, Houston, contractor.

Stanolind Pipe Line Company completed 7.9 miles of 4-inch and 1.8 miles of 6-inch crude gathering line from Knowles field, Lea County, to Jones Ranch station, Gaines County, Texas. C. L. Rogers Construction Company, Wichita Falls, Texas, contractor.

The Texas Pipe Line Company, Shell Pipe Line Corporation, Empire Pipe Line Company, Sinclair Pipe Line Company (Basin Pipe Line System) completed a 515-mile crude carrier from Jal to Cushing, Okla., consisting of 89 miles of 20-inch pipe from Jal to Midland, Texas—Morrison Brothers Construction Company, Odessa, Texas, contractor; 253 miles of 22-inch from Midland to Wichita Falls, Texas—Latex Construction Company, Houston, contractor; 173 miles of 24-inch from Wichita Falls to Cushing—Smith Contracting Company, Fort Worth, contractor.

United States Atomic Energy Commission completed 95 miles of 12-inch gas line from a line 35 miles south of Bloomfield to Los Alamos. Morrison Construction Company, Inc., Austin, Texas, contractor for 43 miles from Cuba to Los Alamos; Haddock Engineers & Associates, Ltd., Santa Fe, contractor for western portion.

New York

Brooklyn Union Gas Company has FPC authorization to construct 12 miles of 10-inch gas line in Brooklyn to distribute gas from Transcontinental's Texas-to-N. Y. project.

Central Hudson Gas & Electric Corporation is authorized by FPC to build a 40-mile pipe line from Home Gas Company's line at Tuxedo to company's gas plant at Poughkeepsie. Line will carry gas for distribution in Duchess, Orange, and Ulster counties.

Central New York Power Corporation and New York Power and Light Corporation have filed a joint application with FPC for construction of a 16-mile gas line from New York State Natural Gas Corporation's system on Otisco-Onondago town line to Central's existing system near Syracuse.

Consolidated Edison Company of New York, Inc., has permission from FPC to build 23 miles of 16- to 30-inch natural gas line to distribute gas in New York City from Transcontinental Gas Pipe Line Company's system.

Home Gas Company has FPC permission to build 24 miles of 12-inch, 28 miles of 10-inch, 18 miles of 8-inch gas line in Orange, Sullivan and Rockland counties.

Iroquois Gas Corporation completed 8 miles of 22-inch line between Hamburg and Langford. H. L. Gentry Construction Company, Jackson, Mich., contractor.

Ohio

The Buckeye Pipe Line Company completed an 82-mile, 22-inch crude line paralleling its existing line from Lima to Toledo. Anderson Brothers Corporation, Houston, contractor.

Daytown Power and Light Company completed 14 miles of 12-, 16- and 18-inch gas line in the vicinity of Dayton. Poston Construction Corporation, Barberton, contractor.

The Manufacturers Light and Heat Company completed a 5-mile, 6-inch gas line from Steubenville to Wintersfield.

Natural Gas Company of West Virginia completed a 5-mile, 8-inch gas line from Brinker station to vicinity of Salem.

The Ohio Fuel Gas Company completed 10.6 miles of 16-inch gas line from Texas Eastern Transmission's system to Crawford station. Sugar Grove. Mahoney Contracting Company, Mount Pleasant, Mich., contractor.

The Ohio Fuel Gas Company completed 27 miles of 20-inch from near Columbus to TETCO's "Big Inch Lines" near Carroll. Mahoney Contracting Company, Mount Pleasant, Mich., contractor.

The Ohio Fuel Gas Company has FPC authorization for the construction of 59.8 miles of 3- to 12-inch line in connection with storage projects in Medina, Lorain, Richland and Hocking counties.

The Ohio Fuel Gas Company is authorized to

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build 85.5 miles of 20-inch replacement line in central Ohio.

The Ohio Fuel Gas Company completed 40 miles of 20-inch from the Reed-Scipio Township line near Attica to the junction of T-50 and D-100 lines near Lime City. Mahoney Contracting Company, Mount Pleasant, Mich., contractor.

The Ohio Fuel Gas Company completed 11 miles of 18-inch from Pavonia station to Weaver station in Richland County. H. L. Gentry Construction Company, Jackson, OMich., contractor.

Ohio Oil Company completed 6 miles of 6- and 7-inch crude line between East Sparta and Canton. Sheehan Pipe Line Construction Company, Tulsa, contractor.

Standard Oil Company (Ohio) completed a 38-mile, 8-inch products line parallel to existing 6-inch line from Toledo to Fostoria. The Britton Construction Company, Hamilton, contractor.

Oklahoma

Cities Service Gas Company is building 23 miles of 10- and 12-inch gas line in the vicinity of West Edmond field. Gragg Construction Company, Britton, contractor.

Consolidated Gas Utilities Corporation completed a 14-mile, 12-inch line from Elk City field, Beckham County, to the company's Carpenter station.

Great Lakes Pipe Line Company has scheduled an 1141-mile products system consisting of 741 miles of 12-inch from Tulsa to Minneapolis and Saint Paul, Minn.; 255 miles of 12-inch from Kansas City to Sioux Falls, S. D.; 45 miles of 8-inch from Cushing to Tulsa. 19 miles, including Mississippi River crossing, has been completed between Minneapolis and Saint Paul by Williams Bros. Corporation, Tulsa. 261 miles from Des Moines to Minneapolis is now being laid by Sheehan Pipe Line Construction Company, Tulsa, A. C. Holder Construction Company, Tulsa, O. R. Burden Construction Company, Tulsa; 54 miles from Ponca City to Barnsdall is under way by A. C. Holder Construction Company; 236 miles from Tulsa to Kaw River, near Kansas City, Mo., by Pacific Pipe Line & Engineers, Ltd., Los Angeles.

Harrington and Marsh completed 12 miles of gas gathering lines in Texas County. Knupp Construction Company, contractor.

Interstate Oil Pipe Line Company completed 17 miles of 12-inch crude line from a point 7 miles south of Maysville station to Tussy station; and 5 miles of 8-inch from 12-inch line at Foster to Elmore City. O. C. Whitaker Company, Fort Worth, contractor.

Magnolia Petroleum Company completed 22 miles of 2- through 24-inch crude gathering system in the Duncan vicinity. C. P. Carter Construction Company, Duncan, contractor.

Mid-Continent Pipe Line Company completed 10 miles of 10-inch crude line from Mounds to Sapulpa, and 9 miles of 8-inch from Sapulpa to Tulsa. C. P. Carter Construction Company, Duncan, contractor.

Northern Oklahoma Gas Company completed 13 milesof 16-inch gas line from Three Sands field to Ponca City. Goldenstern & Stolper, Ponca City, contractor.

Oklahoma Natural Gas Company completed 10 miles of 10-inch in the vicinity of Wetumka, and 8 miles of 10-inch in West Edmond field. Western States Construction Company, Inc., Oklahoma City, contractor.

Oklahoma Natural Gas Company completed 66 miles of 16-inch and 67 miles of 12-inch from near Wewoka to Velma pool in Stephens County. Trojan Construction Company, Oklahoma City, contractor.

Oklahoma Natural Gas Company is constructing a 22-mile, 10-inch line from Stillwater to Guthrie. Trojan Construction Company, Inc., Oklahoma City, contractor.

Phillips Petroleum Company completed a 25-mile gas gathering system near Edmond. Vaughn & Taylor Construction Company, Inc., Wichita Falls, Texas, contractor.

Phillips Petroleum Company completed 90 miles of 8- to 24-inch gas gathering system from Texhoma (Hansford plant). Vaughn & Taylor Construction Company, Inc., Wichita Falls, contractor.

Plains Natural Gas Company plans to build 78 miles of 4- to 24-inch gas gathering system in Hugoton field, Oklahoma Panhandle. Arey-Phillips Construction Company, Dumas, Texas, contractor. This is the first project of a scheduled 282-mile gathering system. Contracts to be let as work progresses.

Shell Piipe Line Corporation and The Texas Pipe Line Company (Ozark Pipe Line System) completed 447 miles of 22-inch crude line from Cushing to Wood River, Ill. 79 miles from Cushing to Chelsea laid by Midwestern Constructors, Inc., Tulsa; 158 miles from Verdigris River to Roxdale station, Mo., by Smith Contracting Corporation, Fort Worth; 210 miles from Roxdale station to Wood River by Anderson Brothers Corporation, Houston.

Shell Pipe Line Corporation completed a 160-mile, 10-inch crude line from Elk City field, Beckham County, to the Ozark Pipe Line System at Cushing. Pipe came from a 190-mile, 10-inch take up from Cushing to Emmitt, Mo., which was replaced by Basin-Ozark System. Trojan Construction Company, Inc., Oklahoma City, contractor.

Sohio Petroleum Company completed 10 miles of 4- to 8-inch crude gathering system in West Edmond field. Western State Construction Company, Inc., Oklahoma City, contractor.

Sunray Oil Corporation completed a 6-mile, 4-inch crude line from Palacine field, Stephens County, to Velma station.

Warren Petroleum Company completed 29 miles of 2- to 26-inch crude gathering line near Maysville. Holland Construction Company, Tulsa, contractor.

Westock Gas Company completed a 14-mile, 12-inch gas line in the vicinity of Edmond. B. H. Walker Construction Company, Oklahoma City, contractor.

Pennsylvania

Eastern Natural Gas Corporation has applied to FPC for permission to build a 292-mile, 24-inch transmission line from Phoenixville to Boston, Mass., with 200 miles of sales laterals along the route. The newly-formed company proposes to sell gas wholesale to public utilities or municipalities along the way.

Erie Gas Service Company, Inc., has application before FPC for construction of a 72-mile gas line from TGT's proposed Kentucky-Buffalo line near Meadville to Wickliffe. Line will supply gas to utilities serving towns east of Cleveland, Ohio.

Grand River Gas Transmission Company has applied to FPC for permission to construct a 42-mile line from TGT's proposed line at Meadville to Austinburg, Ohio; a 22-mile line from Austinburg to Fairport, Ohio; and a 10-mile line from Austinburg to Ashtabula, Ohio.

Gulf Oil Corporation completed 17 miles of 10-12- and 24-inch somastic-coated oil line from the Delaware River and International Airport, Philadelphia, to the 84th Street tank farm. John Meehan & Son, Philadelphia, contractor.

Harrisburg Gas Company has applied to FPC for permission to lay 16 miles of 8-inch line from Manufacturers Light and Heat Company's line to Maytown to Harrisburg.

Lake Shore Pipe Line Company has applied to FPC for permission to construct a 45-mile gas line from TGT's proposed Kentucky-Buffalo line near Meadville to Ashatbula, Ohio. Erie Gas Service Company, Inc., has a similar application before FPC.

The Manufacturers Light and Heat Company completed 10.5-mile, 12-inch gas line from the existing line near Canonsburg to the Pittsburgh area.

New York Natural Gas Corporation completed 31.6 miles of 16-inch line from Rasselas to State Line station. Williams Brothers Corporation, Tulsa, contractor.

New York State Natural Gas Corporation completed 44.2 miles of 16-inch loop from Smethport, McKean County, to New York State Line station at Genesee. Williams-Austin Company, Pittsburgh, contractor.

Penn-York Natural Gas Corporation has application before FPC for permission to construct 65 miles of 10- and 14-inch from York to Lewiston, N. Y., for exporting gas to Canada.

The Peoples Natural Gas Company completed 38.5 miles of 14-inch pipe from Texas Eastern Transmission Corporation's line northeast of Rockwood to company's 14-inch line northeast of Johnstown. Williams-Austin Company, Pittsburgh, contractor.

Sinclair Refining Company completed 26 miles of 8-inch products line from Marcus Hook to Philadelphia. John Meehan & Son, Philadelphia, and Ralph Hopple Construction Company, Canton, Ohio, contractors.

Socony-Vacuum Oil Company, Inc., completed a 22-mile, 6-inch products line known as Reading Spur extending from Malvern-to-Binghamton line. Midwestern Constructors, Inc., Tulsa, contractor.

United Natural Gas Company completed 13.5 miles of 12-inch from Pugh station to Siegel. Northeastern Construction Company, Harrisburg, contractor.

Tennessee

Alabama-Tennessee Natural Gas Company completed 80 miles of 10-inch from Selmer to Tuscumbia, Ala. Lehman-Hoge & Scott, Harlingen, Texas, contractor. Company plans to construct a 35.5-mile, 8-inch extension of this line from Muscle Shoals, Ala., to Decatur, Ala.; 26 miles of 6-inch extension from Decatur to Huntsville; 2.7 miles of 10-inch and 3.8 miles of 8-inch laterals to Tennessee Valley Authority; 10.6 miles of 4-inch and 23.1 miles of 3-inch laterals to serve city-gate customers.

East Tennessee Natural Gas Company has scheduled for 1950 construction 186 miles of 16-inch from TGT's line at Lobelville to Chattanooga, and 112 miles of 12-inch from Chattanooga to Knoxville. 150 miles of 3- to 18-inch laterals will bring gas to many towns between Lobelville and Chattanooga. N. A. Saigh Company, San Antonio, contractor.

East Tennessee Natural Gas Company is planning construction of 150 miles of 16-inch from Knoxville to Bristol.

East Tennessee Natural Gas Company completed 172 miles of 22-inch from TGT's line at Portland to Oak Ridge Atomic Energy plant. Oman Construction Company, Nashville, R. H. Fulton & Company, Lubbock, Texas, Brodie Construction Company, Amarillo, Texas, contractors.

East Tennessee Natural Gas Company is building an 18-mile line between company's Portland Oak Ridge line near Oak Ridge and its proposed Chattanooga-Knoxville line near Knoxville. This will speed up service to Knoxville area, since the Chattanooga-Knoxville line will not be ready until the fall of 1950.

East Texas

Arkansas-Louisiana Gas Company is completing a 162.8-mile, 20-inch project from Waskom field, Harrison County, to Perla, Ark., including submarine crossings of Little Missouri, Ouachita, and Red Rivers. Anderson Brothers Corporation, Houston, is at work on a 72-mile section between Waskom field and Magnolia, Ark.; Latex Construction, Houston, completed the remaining 90.8 miles between Magnolia and Perla.

Arkansas-Louisiana Gas Company completed 12 miles of 3- to 8-inch gathering system in Waskom field. Wood Engineering & Construction Company, Arp, contractor.

C. L. Brown completed a 35-mile, 4-inch line from Fairfield field, Freestone County, to Mexia field, Limestone County.

Coastal Pipe Line Company is considering a 1000-mile gas line from Texas to Virginia.

Mid-Valley Pipeline Company has begun work on its 1000-mile crude line from Longview to Lima, Ohio. Contracts have been let as follows: Haynesville, La., to Mayersville, Miss., 120 miles 20-inch, Latex Construction Company, Houston; Mayersville to Oakland, Miss., 111 miles 22-inch, Associated Pipe Line Contractors, Inc., Houston; Oakland to Henderson, Tenn., 111 miles of 22-inch, Eastern Construction Company, Dallas; Henderson to Clarksville, Tenn., 111 miles of 22-inch, Eastern Construction Company, Dallas; Clarksville to Elizabethtown, Ky., 111 miles of 22-inch, Britton Construction Company, Fort Worth; Elizabethtown to Hebron, Ky., 111 miles of 22-inch, H. L. Gentry Construction Company, Jackson, Mich.; Hebron to Eaton, Ohio, 60 miles of 20-inch, Britton Construction Company, Fort Worth; Eaton to Lima, Ohio, 60 miles of 20-inch, Mahoney Construction Company, Mount Pleasant, Mich.; Magnolia, Ark., to Haynesville, 21 miles of 8-inch, Latex Construction Company, Houston; Delhi, La., to Mayersville, 41 miles of 12-inch, Latex Construction Company, Houston. The Mississippi River crossing at Mayersville, two 20-inch lines, has been completed by Latex Construction Company, Houston; the rest of the project is scheduled for early 1951 completion.

Texas Gas Transmission Corporation has completed most of its 828-mile project from Carthage field to Middletown, Ohio. 103 miles of 20-inch from Carthage field to Lisbon field, La., is still under construction by N. A. Saigh Company, San Antonio, and subcontractors Oklahoma Contracting Company, Inc., Dallas, and Fowler Brothers, Cotton Valley, La. 693 miles of 26-inch from Lisbon field to Middleton has been completed and was contracted as follows: Lisbon to Greenville, Miss., 101 miles, Latex Construction Company, Houston; Greenville to Lula, Miss., 86 miles, O. C. Whitaker Company, Dallas; Lula to Memphis, Tenn., 63 miles, completed in 1948 by N. A. Saigh Company, San Antonio, and J. R. Horrigan Construction Company, Houston; Memphis to Fulton, Ky., 110 miles, J. R. Horrigan Construction Company; Fulton to Slaughters, Ky., 103 miles, Oklahoma Contracting Company, Inc.; Slaughters to Brandenburg, Ky., 85 miles, Williams Bros. Corporation, Tulsa; Brandenburg to Madison, Ind., 65 miles, Williams Bros. Corporation; Madison to Middletown, Ohio, 80 miles, Midwestern Constructors, Inc., Tulsa. Omaha Dredge & Dock Company, Omaha, Neb., did the river crossing construction. Work has not yet begun on a 32-mile, 12-inch lateral from Madisonville, Ky., to Evansville, Ind.

North Texas

Continental Pipe Line Company completed 25 miles of 6-inch crude replacement line from

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Little Wichita River station, Archer County, to company's refinery in Wichita County.

Humble Pipe Line Company completed 5.2 miles of 8-inch crude line in Shackelford and Callahan Counties. Royce L. Boyd Company, Inc., Cisco, contractor.

The Texas Pipe Line Company completed 131 miles of 12-inch crude line from Chico field, Wise County, to Corsicana, Navarro County. Smith Contracting Corporation, Fort Worth, contractor.

The Texas Pipe Line Company completed a 36-mile, 8-inch crude line from Upham Station, Jack County, to Chico Station, Wise County. Latex Construction Company, Houston, contractor.

Southwest Texas

Atlantic Pipe Line Company completed a 30-mile, 10-inch crude line from Refugio to Aransas Pass. Subcontracted from Evans & James Construction Company, Little Rock, Ark., by Shanks & Eustace, Alice.

Carthage Hydrocol, Inc., completed 40 miles of 16-inch, 16 miles of 14-inch, and 7 miles of 12-inch gas line from San Salvador, La Blanca, and South Weslaco fields to synthetic gasoline plant at Brownsville. H. B. Zachry Company, San Antonio, contractor.

Humble Pipe Line Company completed 15 miles of 4-inch and 15 miles of 6-inch crude gathering lines in Rita and Sarita fields, Kenedy County.

La Gloria Corporation completed 14 miles of 8- to 26-inch gas gathering system in La Gloria field, Jim Wells County. Altgelt Construction Company, Corpus Christi, contractor.

Lavaca Pipe Line Company completed 30 miles of 8- and 10-inch natural gas line in the vicinity of Port Lavaca, Calhoun County. Brown & Root,Inc., Houston, contractor.

Pan American Pipe Line Company completed a 5-mille, 4-inch extension to crude gathering system in Pettus field, Bee County. E. M. Null, Houston, contractor.

Southern Pipe Line Corporation completed 18.1 miles of 6-, 7-, and 8-inch gas line between Edroy field, San Patricio County, and Saxet field, Nueces County, Sheppard & Geiger, Corpus Christi, contractor.

Tennessee Gas Transmission Company completed 372.3 miles of looping on its Texas-West Virginia line. Loops were contracted as follows: Cranell to Victoria, 45.5 miles 24-inch, H. C. Price Company, Bartlesville, Okla.; Victoria to Inez, 16.6 miles 30-inch, H. C. Price Company; between Louetta and Negreet, La., 81.8 miles 30-inch, Morrison Construction Company, Inc., Austin; Monroe, La., to Ark.-La. line, 57 miles 30-inch, company crews; Greenville, Miss., to Drew, Miss., 49.2 miles 30-inch, H. C. Price Company; Holly Springs, Miss., to Miss.-Tenn. line, 37.8 miles 30-inch, company crews; Miss.-Tenn. line to Selmer, Tenn., 25.4 miles 30-inch, H. C. Price Company; Union City, Ky., to Clay City, Ky., 14.9 miles 30-inch, Anderson Bros. Corporation, Houston; Clay City to Hilda, Ky., 44.1 miles 26-inch, Anderson Bros. Corporation.

Tennessee Gas Transmission Company completed 121 miles of 6- to 16-inch feeder line in Texas and La.

Tennessee Gas Transmission Company has 109 miles of 30-inch loop line under construction, contracted as follows: White Bluff, Tenn., to Joelton, Tenn., 54.2 miles, and Joelton to Glasgow Ky., 36.1 miles, Morrison Construction Company, Inc., Austin; Union City, Ky., to Buckeye, Ky., 18.1 miles, Anderson Bros. Corporation, Houston.

Tennessee Gas Transmission Company has FPC authorization for construction of the following projects: 395 miles of 26-inch extension from Load Ky., to Buffalo, N. Y.; 707 miles of 30-inch looping from South Texas to Eastern Ky.; 32 miles of 24-inch loop line in South Texas; 52 miles of 26-inch looping in Eastern Ky.; a 44-mile, 16-inch lateral in Pennsylvania; 263 miles of gathering lines in Texas and La. Contracts have not yet been let for these projects.

Transcontinental Gas Pipe Line Corporation has completed 550 miles of its 1840-mile line from the Rio Grande Valley to New York and Brooklyn. Fish Constructors, Inc., Houston, has the master contract. The following contractors have been responsible for the completed portion of the line (all 30-inch): Eunice, La., to Mississippi River, 67 miles, Morrison Construction Company, Austin; Mississippi River to Bassfield, Miss., 112 miles, Morrison Construction Company; Bassfield to Tombigbee River, 112 miles, Wunderlich & Griffis Pipe Line Construction Company, Tulsa; Demopolis, Ala., to Coosa River, Ala., 104 miles, Midwestern Constructors, Inc., Tulsa; Coosa River to Newnan, Ga., 103 miles, Midwestern Constructors, Inc. (this spread not complete); Newnan to Danielsville, Ga., 107 miles, Williams Bros. Corporation, Tulsa. Contracts for line from Danielsville to New York (30-inch to Linden, N. J.) have been let as follows: Danielsville to Spartanburg, S. C., 85.6 miles, Williams Bros. Corporation; Spartanburg to Catawaba River, N. C., 103 miles, R. H. Fulton & Company, Lubbock; Catawaba River to Spray, N. C., 100 miles, R. H. Fulton & Company; Spray to James River, Va., 86 miles, O. R. Smith Contracting Corporation, Fort Worth; James River to Potomac River, Va., 110 miles, O. R. Smith Contracting Corporation; Potomac River to Susquehanna River, Penn., 75 miles, Associated Pipe Line Contractors, Inc., Houston; Susquehanna River to Delaware River, Penn., 85 miles, Wunderlich & Griffis Pipe Line Construction Company; Delaware River to near Linden, N. J., 41 miles, Wunderlich & Griffis Pipe Line Construction Company; Linden to Hudson River near Edgewater, N. J., 28 miles 26-inch, Oklahoma Contracting Company, Inc., Dallas, and J. R. Horrigan Construction Company, Houston. Contracts have not yet been let for the 521.2-mile portion from Mercedes, Rio Grande Valley, to Eunice. This will consist of 36.4 miles of 10-inch, 41.3 miles of 14-inch, 107.5 miles of 24-inch, 64 miles of 26-inch, 272 miles of 30-inch.

United Gas Pipe Line Company is building 12 miles of 16-inch discharge line from fields in De Witt and Goliad counties to company's Refugio-San Antonio line, and 34 miles of gathering line in these fields. Brown & Root, Inc., Houston, contractor.

United Gas Pipe Line Company is building a 72-mile, 20-inch line from fields in Pettus-Burnell area to Converse; a 19-mile, 16-inch line in the San Antonio vicinity; and a 12-mile, 12-inch line in the Austin vicinity. Brown & Root, Inc., Houston, contractor.

Texas Panhandle

El Paso Natural Gas Company completed a 251-mile, 24-inch line from Dumas to Eunice, N. M.

Michigan-Wisconsin Pipe Line Company completed a 1181-mile natural gas line from Hansford County to Austin gas storage field, Mecosta County, Mich., and Green Bay, Wis. The line consists of 1170 miles of 24-inch, 11 miles of 18-inch, with 310 miles of 2- to 14-inch laterals. J. R. Horrigan Construction Company, Inc., Houston, and Oklahoma Contracting Company, Inc., Dallas, contractors.

Panhandle Eastern Pipe Line Company completed 102 miles of 24- and 26-inch gas loops between Liberal, Kansas, and Emporia, Kansas, on Texas- Mich. line, R. H. Fulton & Company, Lubbock, contractor; 30 miles of 26-inch looping in Miss. and Ohio, Anderson Bros. Corporation, Houston, contractor; 23 miles of 26-inch gas looping in Mo., C. S. Foreman Company, Kansas City, Mo., contractor.

Panhandle Eastern Pipe Line Company completed 23 miles of 4- through 12-inch gathering line in Texas, Okla. and Kansas, Wilson Construction Company, Tulsa, contractor; 93 miles of 4- through 10-inch gathering line in Hugoton field, Reese Bros. Construction Company, Hugoton, Kansas, contractor.

Panhandle Eastern Pipe Line Company is authorized to construct 355 miles of 26-inch "C" facility loops on its Texas-Mich. line.

Phillips Petroleum Company completed 25 miles of 8-inch, 10 miles of 10-inch, 12 miles of 14-inch, 9 miles of 16-inch, 70 miles of 24-inch, and 177 miles of 3- to 24-inch gas gathering lines in Sherman and Hansford counties. Vaughn and Taylor Construction Company, Inc., Wichita Falls, contractor.

Phillips Petroleum Company is building 18 miles of 8-inch products loop between Ottawa and Olathe, Kansas, on its Texas Panhandle-Ill. line. Vaughn & Taylor Construction Company, Inc., Wichita Falls, contractor.

Upper Texas Coast

Alamo Refining Company completed 24 miles of 8-inch products line from Sweeny to Freeport. Latex Construction Company, Houston, contractor.

American Republics Corporation completed 22 miles of 6-inch crude oil and gas line in the vicinity of Silsbee. Latex Construction Company, Houston, contractor.

Atlantic Refining Company completed 8.7 miles of 12-, 16-, and 18-inch crude line at company's Port Arthur terminal. Acme Construction Company, Kilgore, contractor.

Dow Chemical Company completed a 15-mile, 4-inch natural gas line in the vicinity of Bay City. Latex Construction Company, Houston, contractor.

Houston Pipe Line Company is building a 14-mile, 12-inch gas line from Crosby to Baytown. L. E. Farley, Inc., Houston, contractor.

Humble Pipe Line Company completed 5 miles of 5-inch and 7.4 miles of 6-inch crude line from Double Bayou field to Anahuac field, Chambers County.

Midland Gasoline Company completed 30 miles of 2- through 20-inch gas gathering system in Conroe field. Gulf Welding Company, Conroe, contractor.

Piedmont Natural Gas Corporation has applied to FPC for permission to build a 1290-mile, 20-inch line from the Gulf Coast to southeastern Va. with a branch to Richmond and one to Norfolk.

Shell Pipe Line Corporation completed 21 miles of 3- and 4-inch gas gathering system in Sheridan field, Colorado County. C. W. Sternberg, Houston, contractor.

Stanolind Oil & Gas Company completed 16 miles of 6-inch gas line from Chocolate Bayou and Rowan fields, Brazoria County, to company's gasoline plant at Hastings. W. L. Golightly Construction Company, Houston, contractor.

Sun Pipe Line Company completed 43 miles of 8- and 10-inch crude line between Seabreeze station, near Beaumont, and Port Neches terminal. Sheppard-Geiger Construction Company, Corpus Christi, contractor.

Texas Eastern Transmission Corporation is constructing a 175-mile, 26-inch loop line from Lebanon, Ohio, to Beallsville, Ohio. Brown & Root, Inc., Houston, sublet contract to Associated Pipe Line Contractors, Inc., Houston, which has completed all but 30 miles of a 120-mile line from Lebanon to Lancaster, and to Williams Bros. Corporation, Tulsa, which has completed remainder.

Texas Eastern Transmission Corporation completed 36 miles of 20-inch loop between Castor, La., and Lisbon field, La., on its Texas-N. J. line. Associated Pipe Line Contractors, Inc., Houston, contractor.

Texas Eastern Transmission Corporation is authorized to build 100 miles of 16-inch transmission line from Provident City field to company's Baytown terminal, and 33.5 miles of 20-inch loop in the vicinity of Beaumont.

Texas Eastern Transmission Corporation has an application before FPC for permission to construct 255 miles of 30-inch loop between Lebanon, Ohio, and Connellsville, Penn., on its Texas-N. J. line; 255 miles of 26-inch transmission from Lambertville, N. J., to Boston, Mass.; 292 miles of laterals from this transmission line to points in Conn., R. I., Mass., and N. H.

Texas Eastern Transmission Corporation has FPC authorization to construct 75 miles of feeder lines to Texas and Louisiana gas fields.

Texas Eastern Transmission Corporation applied to FPC for permission to construct 1420 miles of loops on its Texas-to-New Jersey main line.

Texas Illinois Natural Gas Pipe Line Company has an application before FPC for the construction of 1254 miles of 30- and 26-inch line from southwest of Houston to Joliet, Ill. It also plans to build a 58-mile, 20-inch line from Joliet to Volo, Ill., and a 20-mile, 26-inch lateral from the proposed Houston-Joliet line to Piedmont Natural Gas Corporation's proposed Texas-Va. line near Greenville, Miss.

Texas Pipe Line Company completed 10.8 miles of 10-inch and 2.5 miles of 8-inch crude line from company's Withers station, Wharton County, to Pickett Ridge field, Wharton County. Associated Pipe Line Contractors, Inc., Houston, contractor.

The Texas Pipe Line Company completed 13.5 miles of 6-inch crude line from Blessing Junction, Matagorda County, to Markham station. Sheppard-Geiger Construction Company, Corpus Christi, contractor.

The Texas Pipe Line Company completed 16.2 miles of 6-inch crude line from Chocolate Bayou field to Manvel. Latex Construction Company, Houston, contractor.

West Texas

Arizona Pipe Line Company plans a 620-mile, 8-inch crude line from the Permian Basin to Phoenix, Ariz.

Atlantic Pipe Line Company completed 382 miles of 10-inch crude line from Block 31 field terminal, Crane County, to tie into its Refugio-Harbor Island system at Refugio. Evans & James Construction Company, Little Rock, Ark., contractor.

Atlantic Pipe Line Company completed a 6-mile, 4-inch crude discharge line in Bronte field, Coke County.

Cabot Carbon Company completed 26 miles of 10-inch gas line in the vicinity of Odessa. McVean & Roberts Pipe Line Construction Company, Odessa, contractor.

El Paso Pipe Line Company completed a 110-mile gas line from Plymouth and Slick-Urchel discovery, Upton County, to Jal, N. M.

Gulf Oil Corporation (Gulf Production Division) completed 50 miles of 3- to 30-inch gas gathering system between Waddell gasoline plant, Crane County, to Odessa. J. J. Willis Construction Company, Odessa, contractor.

Humble Pipe Line Company is constructing a 371-mile, 18-inch crude line from Kemper,

Reagan County, to Satsuma, Harris County. Morrison Construction Company, Inc., Austin, is at work on a 178-mile section from Kemper to Eckart; Anderson Bros. Corporation, Houston, will begin the remaining 193 miles in March, 1950.

Humble Pipe Line Company completed 10 miles of 6-inch crude discharge line in Susan Peak field, Tom Green County.

Humble Pipe Line Company plans construction of an 80-mile crude line from Bronte field, Coke County, to its West Texas trunk system near San Angelo.

Magnolia Pipe Line Company completed a 25-mile, 8-inch crude line from Pegasus field, Midland-Upton County, to its trunk line near Midland. C. L. Rogers Construction Company, Inc., Wichita Falls, contractor.

Magnolia Pipe Line Company completed 25.5 miles of 8-inch crude line from Iatan station to point in Scurry County; 12 miles of 6-inch northeast to North Snyder field; and 30 miles of 3- and 4-inch lateral lines to leases. C. L. Rogers Construction Company, Inc., Wichita Falls, contractor.

Onyx Oil & Refining Company completed 16 miles of 4-inch crude line from Hardy field, Jones County, to its refinery north of Abilene.

Pasotex Pipe Line Company completed 22 miles of 6-inch crude discharge lines from North Snyder field, Scurry County, to Colorado station on Basin Pipe Line System.

Pasotex Pipe Line Company plans a 17-mile, 6-inch crude line from Colorado station, to Coltex Refining Company's Colorado City refinery. This will be an extension to North Snyder field to Basin Pipe Line System line.

Phillips Pipe Line Company completed 289 miles of 12-inch crude line from Goldsmith field, Ector County, to refinery at Borger. Morrison Construction Company, Inc., Austin, contractor.

Republic Pipe Line Company completed 40 miles of 4-inch crude line from Susan Peak field, Tom Green County, to Shell's line west of Eldorado. Sheppard-Geiger Construction Company, Corpus Christi, contractor.

Shell Pipe Line Corporation plans a 40-mile, 10-inch crude line from its terminal at McCamey to Humble's terminal at Kemper.

Shell Pipe Line Corporation completed a 73-mile crude line from Wasson to Jal, N. M. Smith Contracting Corporation, Fort Worth, built 33 miles of 12-inch from Wasson to Hobbs, N. M., and Latex Construction Company, Houston, built 40 miles of 14-inch from Hobbs to Jal.

Southern Union Gas Company completed a 10-mile, 4-inch gas line between Tippett field, Crockett County, and McCamey, Upton County.

Stanolind Oil & Gas Company completed 165 miles of 2- to 30-inch gas gathering system in Levelland field, Hockley County. Deaton & Sons, Inc., Odessa, contractor.

Stanolind Oil & Gas Company completed a 19-mile, 6-inch product line from its plant in Fullerton field, Andrews County, to Eunice, N. M. Deaton & Sons, Inc., Odessa, contractor.

Stanolind Oil & Gas Company completed 63 miles of 2- through 26-inch gas gathering system in Fullerton field, Andrews County. Deaton & Sons, Inc., Odessa, contractor.

Stanolind Pipe Line Company completed 7.7 miles of 6-inch products line between Slaughter casinghead plant, Hockley County, and company's Slaughter pump station, Hockley County, Crosley and Hardy, Levelland, contractor.

Stanolind Pipe Line Company completed a 9-mile, 4-inch crude line from Jones Ranch field, Gaines-Yoakum County to Wasson field pump station, Yoakum County.

Stanolind Oil & Gas Company completed 25 miles (23 miles coated) of 2- to 22-inch gas gathering system in Fullerton field. Deaton & Sons, Inc., Odessa, contractor.

The Texas-New Mexico Pipe Line Company completed 26 miles of 8-inch crude line running southwest from its Shafter Lake station in Andrews County. Wright Construction Company, Lovington, N. M., contractor.

The Texas-New Mexico Pipe Line Company completed 40 miles of 10-inch crude trunk line from its new pump station in southwest Borden County to the Basin Pipe Line System at Colorado station, southeast Scurry County. Carl H. Dunn, Fort Worth, contractor. Company will build 29 miles of 6-inch extensions from its pump station to Sinclair, Vealmoore, and Good fields.

The Texas-New Mexico Pipe Line Company completed 16 miles of 6-inch and 5.4 miles of 4-inch crude line from southwest Borden County to northwest Howard County. Wright Construction Company, Lovington, N. M., contractor.

Utah

Mountain Fuel Supply Company completed a 32-mile, 20-inch natural gas line from Coalsville to Salt Lake City. Enoch Smith Sons, Salt Lake City, contractors. This line parallels existing 16-inch line.

Salt Lake Pipe Line Company has completed all but 60 miles of its 320-mile, 8-inch products line from Standard of California's Salt Lake City refinery to Boise, Id. Smith Contracting Corporation, Fort Worth, completed 169 miles from Salt Lake City to Burley, Id.; Oklahoma Contracting Company, Dallas, and Grafe-Callahan Construction Company, Los Angeles, contractors for remaining 151 miles, are shut down for the winter with 60 miles incomplete.

Virginia

Commonwealth Natural Gas Corporation has an amended application before FPC for construction of a 200-mile line from Virginia Gas Transmission Corporation's 20-inch line in Greene County to the vicinity of Norfolk.

Eastern Natural Gas Company has applied to FPC to build a 165-mile line from Standardsville to Norfolk.

Potomac Gas Company is planning an 18-mile, 16-inch line from Dranesville to Arlington.

Roanoke Pipe Line Company has applied for permission to build a 30-mile gas line from Virginia Gas Transmission Corporation's line at Gala to Roanoke.

Virginia Natural Gas Company has applied to FPC for permission to build 153 miles of transmission line from Transcontinental's 30-inch line at Buckingham to Norfolk, and 12.5 miles of laterals.

West Virginia

Atlantic Seaboard Corporation and Virginia Gas Transmission Company completed 268 miles of 26-inch gas line from Clendenin to Rockville, Md. Ray L. Smith & Son, El Dorado, Kan., completed 68 miles from Clendenin to Cleveland, and H. C. Price Company, Bartlesville, Okla., built the remainder of the line.

Hope Natural Gas Company completed a 12.2 mile, 14-inch loop from Shirley, Tyler County, to Hastings, Wetzel County, and a 33-mile, 16-inch loop from Hastings to Clarksburg, Harrison County. Pipe Line Construction and Drilling Company, Camp Hill, Pa., contractor.

United Fuel Gas Company completed 12 miles of 10-inch from Charleston to Branchland and 5 miles of 12-inch near Branchland. Williams-Austin Company, Pittsburgh, contractor.

United Fuel Gas Company plans 12 miles of 10- and 12-inch from TGT's transmission line to storage fields near Nitro and Clendenin.

Wisconsin

Michigan - Wisconsin Pipe Line Company is planning to build 197.5 miles of gas line. Main line will run from Milwaukee to Green Bay with laterals to Fond du Lac and Sheboygan. G. G. Griffis Construction Company, Tulsa, contractor.

Wyoming

Continental Oil Company completed 18 miles of 3- to 8-inch main line and gathering system between Buck Creek field and Lance Creek field, Niobrara County. C. P. Bartley & Son, Lance Creek, contractor.

Frontier Refining Company is planning a 300-mile products line from its refinery at Cheyenne to Omaha, Neb. Pacific Pipe Line Engineers, Ltd., San Francisco, is making engineering study of project.

Montana-Dakota Utilities Company and Montana-Wyoming Gas Pipe Line Company have FPC authorization to build a 340-mile, 12-inch line from Worland field, Washakie County, to Montana-Dakota's Cabin Creek station, Fallon County.

Plains Pipe Line Company completed 50 miles of 8-inch crude line from Mush Creek field, Weston County, to Rocky Mountain Pipe Line Company's line at Lance Creek field. A. W. Hartwig, Inc., Billings, Mont., contractor.

Socony-Vacuum Oil Company, Inc., completed 13.5 miles of 4-inch crude line from Gooseberry Field, Park County, to Ohio Pipe Line Company's station in Hot Springs County. Pacific Pipe Line & Engineers, Ltd, San Francisco, contractor.

Socony-Vacuum Oil Company, Inc., completed 7 miles of 4-inch crude line between South Cole Creek field and existing 4-inch line from Cole Creek field to company's refinery at Casper. C. P. Bartley & Son, Lance Creek, contractor.

Socony-Vacuum Oil Company, Inc., is planning a 122-mile, 8-inch crude line from Big Horn Basin to Casper.

Stanolind Pipe Line Company completed 14 miles of 8-inch crude line from Sussex field, Johnson County, to company's Salt Creek station, Natrona County.

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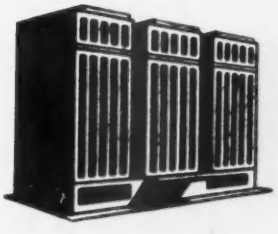

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Every "Cat" Diesel Motor Grader is "Caterpillar"-built *through and through*—from front wheels to rear—from complete engine to final drive. All mechanical parts are designed and fitted together for matched performance, correct balance, proper weight distribution and long life. "Caterpillar" design, engineering and construction are all aimed at helping you get the utmost out of your motor grader investment. The records prove it . . . 99% of all "Caterpillar" Motor Graders ever built are *still on the job!*

Your "Caterpillar" dealer can give you plenty of additional facts and figures. Meantime, send the coupon today.

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This "Caterpillar" Diesel No. 12 Motor Grader is building an access road to a drill site near Santa Maria, California. The "Cat" No. 12 is a profitable tool for many other oilfield jobs, such as leveling drill sites and digging slush pits. High production and precision blading call for the balanced design and matched performance of an all-"Caterpillar" Motor Grader.

•

Standard "Caterpillar" Diesel Motor Graders are priced as follows: No. 12, $10,920; No. 112, $9545; No. 212, $6435, all prices f.o.b. Peoria, Illinois, subject to change without notice.

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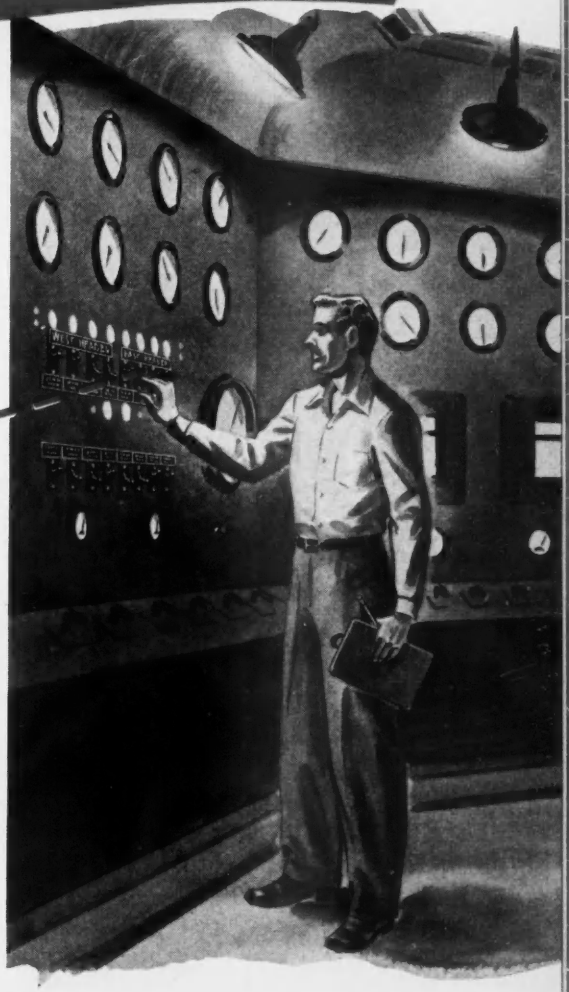
Instant, centralized control of lines

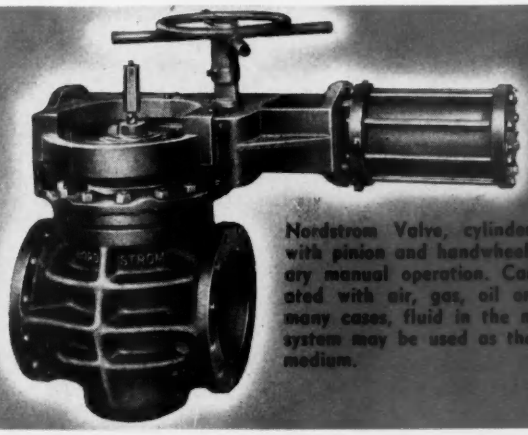
any distance ★

any pressure ★

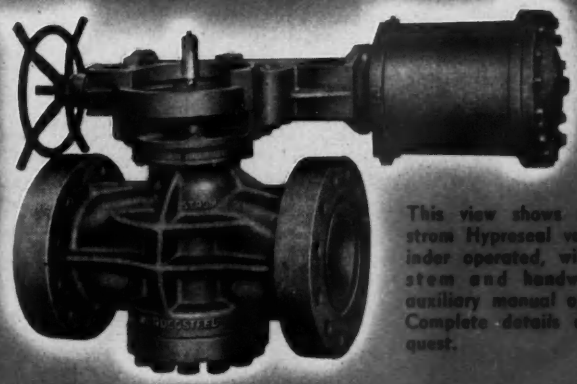
any capacity ★



With Nordstrom electric motor or cylinder operated valves you can arrange control of your manifolds, pipelines and other remotely located operations independent of manual control. Standard cylinders are available for installations in which this type of control is preferable. For operating pressure ranges from 50 to 200 lb. gauge pressure, complete with cylinder mounting bracket and all operative parts assembled. Nordstrom plug design gives positive closing and opening with only a quarter-turn—and the plug is permanently seated. You save man-hours and maintain instant control.



Nordstrom Valve, cylinder operated, with pinion and handwheel for auxiliary manual operation. Can be operated with air, gas, oil or water. In many cases, fluid in the main piping system may be used as the operating medium.



This view shows a Nordstrom Hypreseal valve, cylinder operated, with screw stem and handwheel for auxiliary manual operation. Complete details upon request.

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PAA

HOW TO—Improve Traction of Crane

Pipe lines commonly encounter swampy and muddy terrain. In these areas, where side-boom tractors have plowed up a low water-soaked right-of-way, it is sometimes difficult for the heavier, slower-speed motorized cranes to operate. One pipe line contractor laying a main line in Mississippi aided the traction of treads on cranes by the simple but effective device illustrated.

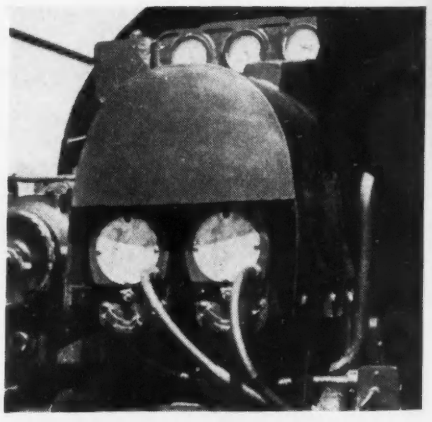
By adding short sections of worn three-fourths inch chain to alternate hinged sections on the tread, additional footing was gained. In soft and soggy ground intermixed with roots and logs, these chain pieces give added traction to enable the crane to move faster through such spots along the right-of-way.

The chains have been added in such a manner that they can easily be removed when not required. Holes have been bored near the ends of each hinged tread section so that a short bolt inserted through the end link of the chain pieces can be fastened to the tread. When not required, these chains can be unbolted and stored in the engine cab for future use.

HOW TO—Put Cover on Magnetos

Magnetos on gas-engine-driven compressors operated in the open air without housing facilities can be protected from short-outs, due to rain and moisture, with an all steel sheet metal cover. Principal part of this cover consists of a strip of the metal long enough, that when shaped to cover the instruments, to reach from the outside of one magneto over both units to the outside of the opposite one, allowing adequate length to prevent the cover from touching either magneto at any point except at the base.

Front of the cover is a semi-circular sheet welded to the cover to prevent water from filtering into the breaker boxes. Back of the cover has a similar piece of metal welded to the cover with the addition of a box-like extension which encloses the high tension wiring. Holes in the end of this extension are punched, or drilled, to a size so that flexible rubber grommets can be used similarly to the rubber caps frequently used on automobile distributors to prevent water from being carried back along the wires to the distributors of the magnetos. The cover can be removed readily for inspection by taking out the retaining capscrews which are used to fasten the cover to each side of the magneto assembly.



TESCO IS EQUIPPED TO CAST THE BIG ONES!

THIS 30" PIPE LINE CHECK VALVE casting measures five feet long, five feet high and weighs 7000 lbs. It is typical of the large castings which TESCO regularly produces for pipeline equipment manufacturers. Removing risers with acetylene torches, as shown here, is one of TESCO's finishing operations. Grinding, sandblasting and rigid final inspections will assure the equipment manufacturer of a strong, sound casting which will require minimum machining. Let the TESCO representative show you how steel castings can help you produce stronger, better appearing products at less cost. TESCO is the most experienced foundry on the Gulf Coast. TEXAS ELECTRIC STEEL CASTING COMPANY, HOUSTON, TEXAS

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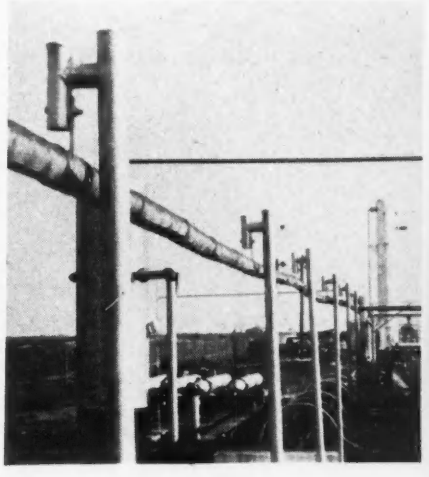
HOW TO—Support Overhead Piping

Where steam lines are carried overhead, a simple pipe support which allows the pipe to expand and contract may be fabricated from materials usually found around the plant yard. Four-inch risers are cemented into the ground after welding on a short nipple and cross piece as shown. A short piece of scrap iron is welded to the top of the steam line where each of the risers is placed. A half-inch bolt is then run through the bottom of the nipple which has been welded to the riser and through the top of the strap iron.

This arrangement permits easy application of insulation after the piping is in place and prevents the insulation from touching any stationary part which would cause skuffing of the pipe covering. The strap iron pieces should be at least 12 inches long so that the pipe can expand and contract without placing a strain on the risers.



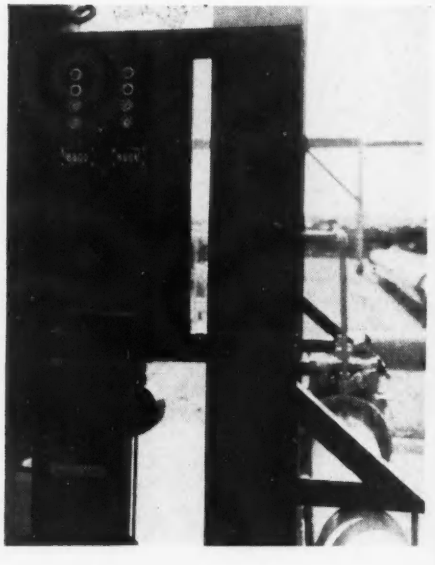
HOW TO—Mount Motor Controls

To provide a rigid mounting for motor controls, and thus to protect them against possible damage when hoisting yard equipment, one company mounts the controls for the tank-farm suction pumps on a steel panel, carried on a pair of arms welded to a steel column.

The arms are spaced to match the top and bottom of the steel panel, which in turn is bolted to the arms for removal for machining in case a change in controls is desired.

Switches are mounted on the back of the steel panel, with the push-buttons set in openings which protect the buttons against accidental contact.

The supporting arms are sturdy enough to carry the entire weight of the controls and main junction box, and thus relieve the conduits of any strain.



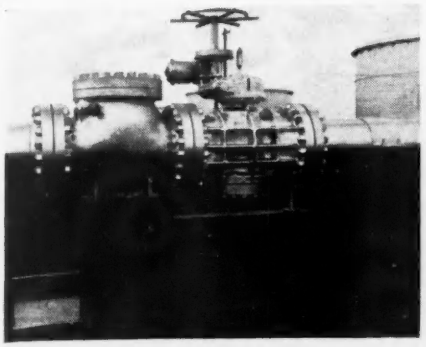
HOW TO—Level Main Check Valve

On large diameter lines the weight of valves and fittings is such that they must be supported or they will make it difficult to tighten flanges, and also to control direction of motion as the line varies in length under temperature changes.

On one 24-inch line, the main line check valve is mounted on a support plate which allows lateral motion. The main valve is flanged to the check, and a short section of main line beyond the companion flange allowed to extend over the next support, on which the line is

clamped so as to allow axial change of position.

To relieve the flange on the stub line of the load of one end of the valve, and also to simplify alignment when the



flange bolts are pulled up, a screw-type jack is set between an extension of the check valve concrete base and the valve body. The upper end of this support carries a saddle to fit the curve of the valve body flange, while a flat base distributes the load on the concrete. A right-and-left screw member permits vertical adjustment, and also provides leverage for levelling the main valve.

After being adjusted, the threads of the jack are filled with paint to prevent rusting.

HOW TO—
Lift Heavy Cover From Line Strainer

Where strainers are periodically cleaned in oil lines, a convenient arrangement for cleaning them may be arranged as shown. A three-inch nipple is driven into the ground approximately six inches from the strainer cap. The beam for the hoist is made of 2½-inch pipe welded at right angles by means of a welding ell. A diagonal piece of two-inch pipe is used for a brace. The lower end is inserted into the three-inch well and rests on a flange which is welded on the upright approximately six inches from the end.

The other end of the frame carries an eye welded into the lower side of the beam for insertion of the chain hoist. The chain hoist hooks into a bar which is inserted into holes drilled across the reinforcing ribs of the cap.

In operation, the pressure is bled from the line, the flange bolts removed,

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PIPE LINE CONTRACTORS
NEW CONSTRUCTION
MARINE CROSSINGS - RECONDITIONING
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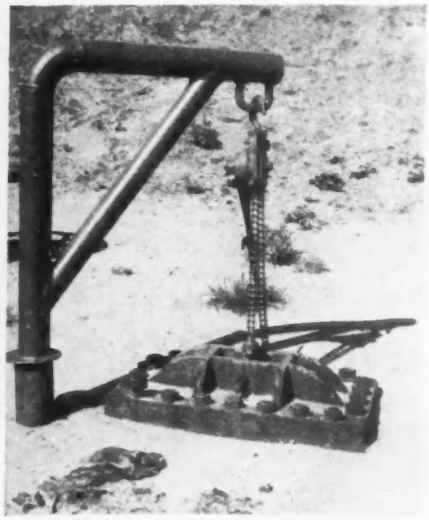


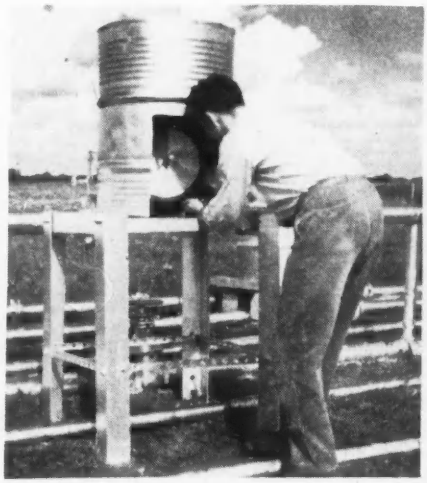
and the cap lifted off by means of the hoist. The strainer element is then raised with the same chain hoist, then cleaned and replaced.

At each pump station, a well is made beside each of the strainer cages and the same beam and hoist assembly is used on all the strainers.

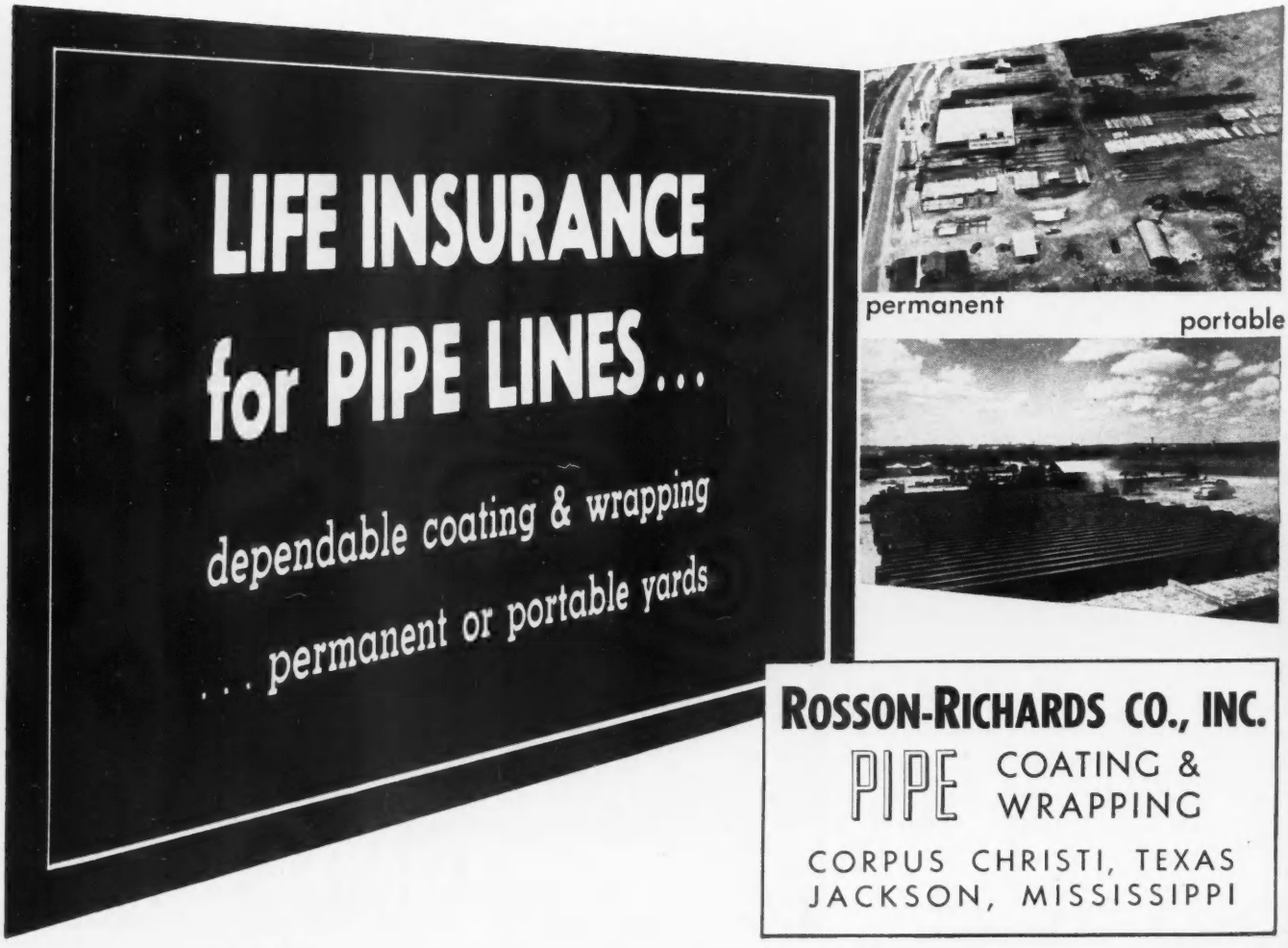
HOW TO—Guard Portable Meters

When portable meters are used to measure gas for gas-oil ratios and other testing purposes, the portable meter is usually set on the ground out in the open where it is exposed to the elements. A method for protecting the meter is shown. A stand is made from angle iron usually found around the yard where derricks and tanks are stored. Four legs are cut from 4-by-4-inch angle iron and holes drilled for horizontal braces around the top and near the bottom. After these are bolted fast, boards are laid on the inside of the top angles and the portable meter set on the floor thus made.

Top of a drum is cut out and a 18-x-18-inch window cut in the front. This is set down over the top of the meter, thus effectively protecting it from the weather, yet affording full visibility and access.



These stands may be transferred with the meter or several may be installed at each station.



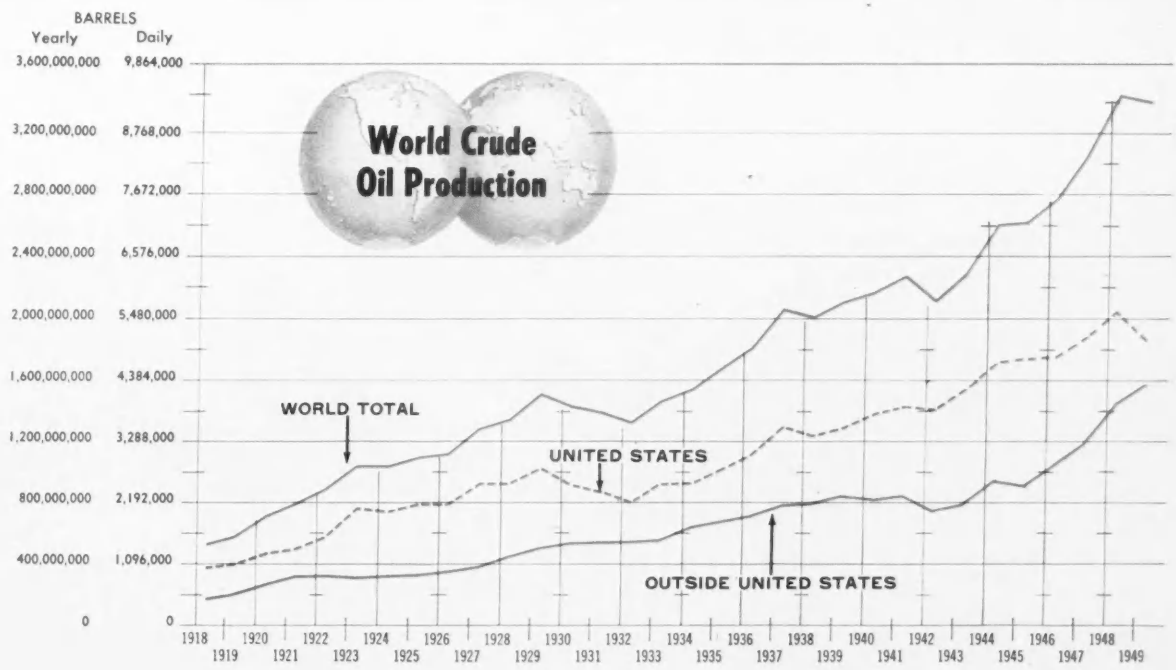
WORLD CRUDE PRODUCTION

1 Percent Short of 1948 Record

FOR THE first time since 1942, world crude production failed to show an increase over the previous year, as total output dropped to 3,388,883,000 barrels during 1949, just 1 percent short of equalling the all-time record of 3,425,283,000 barrels established in 1948. The total is still well above that produced in 1947 or any other previous year.

Expressed in daily average terms, production of 9,284,610 barrels in 1949 dropped 74,086 barrels daily below the 9,358,696 barrel average maintained during 1948. The decrease for the year was relatively small due to rapid recovery during the latter part of the year from the slump during the early months which, if continued, would have dropped year's total perhaps as much as 6 to 8 percent below 1948.

At the close of 1948, crude production throughout the major producing regions of the world was climbing at a rate never before achieved, and many factors pointed toward a continuation of such a trend. However, with sharp decreases in demand in some of the principal consuming centers, particularly in respect to heating oils, the industry found itself in a rather tight storage position and



(All Figures in Barrels)

YEAR	WORLD		UNITED STATES		OUTSIDE U.S.A.		YEAR	WORLD		UNITED STATES		OUTSIDE U.S.A.	
	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average		Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1918	503,515,000	1,378,000	355,928,000	975,000	147,587,000	403,000	1934	1,522,281,000	4,170,000	908,065,000	2,488,000	614,216,000	1,682,000
1919	555,875,000	1,523,000	378,367,000	1,037,000	177,508,000	486,000	1935	1,654,488,000	4,532,000	996,596,000	2,730,000	657,892,000	1,802,000
1920	688,884,000	1,887,000	442,929,000	1,213,000	245,955,000	674,000							
							1936	1,791,540,000	4,908,000	1,099,687,000	3,013,000	691,853,000	1,895,000
1921	766,002,000	2,098,000	472,183,000	1,294,000	293,819,000	804,000	1937	2,039,231,000	5,587,000	1,279,160,000	3,505,000	760,071,000	2,082,000
1922	858,898,000	2,353,000	557,531,000	1,528,000	301,367,000	825,000	1938	1,988,041,000	5,446,000	1,214,355,000	3,327,000	773,686,000	2,119,000
1923	1,015,736,000	2,783,000	732,407,000	2,007,000	283,329,000	776,000	1939	2,086,160,000	5,715,500	1,264,962,000	3,465,600	821,198,000	2,249,900
1924	1,014,318,000	2,779,000	713,940,000	1,956,000	300,378,000	823,000	1940	2,149,821,000	5,873,800	1,353,214,000	3,697,300	796,607,000	2,176,500
1925	1,068,933,000	2,928,000	763,743,000	2,092,000	305,190,000	836,000							
							1941	2,220,657,000	6,084,000	1,402,228,000	3,841,700	818,429,000	2,242,300
1926	1,096,823,000	3,005,000	770,874,000	2,112,000	325,949,000	893,000	1942	2,093,100,000	5,734,500	1,386,645,000	3,799,000	706,455,000	1,935,500
1927	1,262,582,000	3,459,000	901,129,000	2,469,000	361,453,000	990,000	1943	2,256,625,000	6,182,500	1,505,613,000	4,125,000	751,012,000	2,057,500
1928	1,324,774,000	3,629,000	901,474,000	2,469,000	423,300,000	1,160,000	1944	2,592,514,000	7,083,371	1,677,904,000	4,584,437	914,610,000	2,498,934
1929	1,485,867,000	4,071,000	1,007,323,000	2,760,000	478,544,000	1,311,000	1945	2,594,959,000	7,109,476	1,713,655,000	4,694,945	881,340,000	2,414,531
1930	1,410,037,000	3,863,000	898,011,000	2,460,000	512,026,000	1,403,000							
							1946	2,745,667,000	7,522,375	1,733,939,000	4,750,517	1,011,728,000	2,771,857
1931	1,372,532,000	3,760,000	851,081,000	2,332,000	521,451,000	1,428,000	1947	3,021,668,000	8,278,542	1,856,987,000	5,087,635	1,164,681,000	3,190,906
1932	1,309,677,000	3,588,000	785,159,000	2,151,000	524,518,000	1,437,000	1948	3,425,283,000	9,358,696	2,016,282,000	5,508,967	1,409,001,000	3,849,729
1933	1,442,146,000	3,951,000	905,656,000	2,481,000	536,490,000	1,470,000	1949	3,388,883,000	9,284,610	1,839,615,000	5,040,041	1,549,268,000	4,244,569

sharp cutbacks were made in areas producing heavy crude used principally for fuels. Venezuela, for example, in early months of the year, cut production to about 150,000 barrels daily less than the year-round average for 1948. But by the end of the year its output had climbed back to levels higher than the peak daily output of the record year 1948.

The U. S., which despite steady increases of the past years has been producing a progressively smaller percentage of the world's total crude output, suffered the greatest decrease in yield of any country in the world. Although still by far the largest producer, the 5,040,041 barrels a day produced in 1949 was 8.5 percent below the 5,508,967 barrels produced daily during 1948, when for the first time in its producing history the U. S. produced more than 2 billion barrels of crude in a single year. On a daily average basis, U. S. production during 1949 even fell below that of 1947 by more than 45,000 barrels.

This decline in U. S. production occured despite only a slight decrease in demand. Producers in the U. S. steadily cut back output from their own wells as crude oil in increasing amounts was brought in from outside sources as imports. Much of the imports came from Caribbean areas, but a greatly increased supply has been coming in from the Middle East.

In 1948, U. S. production accounted for 58.87 percent of all oil produced in the world. In 1949, the percentage had fallen to 54.29 percent.

Elsewhere in North America, all producing countries showed substantial gains. The most outstanding perform-

World Crude Oil Production, By Countries, in 1948 and 1949, and Cumulative Production Through 1949

(Sources: U. S. Bureau of Mines except 1949 from private sources or estimated by WORLD OIL)

CONTINENT and COUNTRY	ANNUAL PRODUCTION (Thousands of Barrels) 1948	ANNUAL PRODUCTION (Thousands of Barrels) 1949	DAILY AVERAGE PRODUCTION (Actual Barrels) 1948	DAILY AVERAGE PRODUCTION (Actual Barrels) 1949	% Diff. '48-'49	YEAR'S PRODUCTION Percent of World 1948	YEAR'S PRODUCTION Percent of World 1949	CUMULATIVE PRODUCTION TO JANUARY 1, 1950 (Thousands of Barrels) Total	As % of World
NORTH AMERICA—									
Canada	12,098	21,564	33,054	59,079	+ 78.7	0.35	0.64	162,505	0.27
Cuba	159	161	434	441	+ 1.6	.....	.....	2,080	....
Mexico	58,508	60,721	159,857	166,359	+ 4.1	1.71	1.79	2,409,722	3.90
United States	2,016,282	1,839,615	5,508,967	5,040,041	— 8.5	58.87	54.29	38,939,286	63.07
Total North America	2,087,047	1,922,061	5,702,314	5,265,921	— 7.7	60.93	56.72	41,513,593	67.24
SOUTH AMERICA—									
Argentina	23,734	23,992	64,847	65,732	+ 1.4	0.69	0.71	436,220	0.70
Barbadoes	.....	.....	.....	.....	.....	.....	.....	8	....
Bolivia	464	671	1,268	1,838	+ 45.0	0.01	0.02	4,964	0.01
Brazil	144	107	393	293	— 25.4	.....	.....	638	....
Columbia	23,792	30,094	65,005	82,449	+ 26.8	0.69	0.89	471,327	0.76
Ecuador	2,563	2,665	7,003	7,301	+ 4.3	0.08	0.07	46,446	0.08
Peru	14,069	14,500	38,440	39,726	+ 3.3	0.41	0.43	386,187	0.63
Trinidad	20,111	20,644	54,948	56,559	+ 2.9	0.59	0.61	392,492	0.64
Venezuela	490,015	483,804	1,338,838	1,325,490	— 1.0	14.31	14.28	5,005,451	8.11
Total South America	574,892	576,477	1,570,743	1,579,389	+ 0.6	16.78	17.01	6,743,733	10.93
EUROPE—									
Albania	1,400	1,250	3,825	3,425	— 10.5	0.04	0.04	14,124	0.02
Austria	6,149	6,315	16,801	17,301	+ 3.0	0.18	0.19	58,136	0.09
Czechoslovakia	204	209	557	573	+ 2.9	0.01	0.01	4,350	0.01
France	370	375	1,011	1,027	+ 1.6	0.01	0.01	14,369	0.02
Germany	4,446	5,955	12,148	16,315	+ 34.3	0.13	0.18	98,715	0.16
Great Britain	323	318	883	871	— 1.4	0.01	0.01	4,450	0.01
Hungary	3,542	3,570	9,678	9,781	+ 1.1	0.10	0.11	45,665	0.07
Italy	70	75	191	206	+ 7.9	.....	.....	3,523	0.01
Netherlands	3,444	4,302	9,410	11,786	+ 25.2	0.10	0.13	9,714	0.02
Poland	1,000	995	2,732	2,726	— 0.2	0.03	0.02	278,444	0.45
Roumania	30,868	29,980	84,339	82,137	— 2.6	0.90	0.88	1,218,734	1.98
U. S. S. R. (Russia)	218,000	233,625	595,628	640,069	+ 7.5	6.37	6.89	6,292,473	10.19
Yugoslavia	365	365	997	1,000	+ 0.3	0.01	0.01	2,511	....
Total Europe	270,181	287,334	738,199	787,216	+ 6.6	7.89	8.48	8,045,208	13.03
AFRICA—									
Egypt	13,398	15,504	36,607	42,477	+ 16.0	0.39	0.46	136,009	0.22
Other Africa	102	98	279	268	— 3.9	.....	.....	662	....
Total Africa	13,500	15,602	36,885	42,745	+ 15.9	0.39	0.46	136,671	0.22
ASIA, Middle East—									
Bahrein	10,915	10,967	29,822	30,047	+ 0.8	0.32	0.32	109,882	0.18
Iran	190,395	202,839	520,205	555,723	+ 6.8	5.56	5.99	2,141,516	3.47
Iraq	26,115	29,566	71,352	81,003	+ 13.5	0.76	0.87	440,802	0.71
Kuwait	46,098	92,163	125,951	252,501	+100.5	1.35	2.72	160,417	C.26
Saudi Arabia	142,853	174,009	390,309	476,737	+ 22.1	4.17	5.13	519,060	0.84
Total Middle East	416,376	509,544	1,137,640	1,396,011	+ 22.7	12.16	15.03	3,371,677	5.46
ASIA, Far East—									
Borneo, British (Sarawak & Brunei)	20,120	24,729	54,972	67,750	+ 23.2	0.59	0.73	183,501	0.30
Bruma	360	256	984	701	— 28.8	0.01	0.01		
India	1,742	1,907	4,760	5,224	+ 9.7	0.05	0.05	338,830	0.55
Pakistan	490	675	1,339	1,849	+ 38.1	0.01	0.02		
China	533	500	1,456	1,370	— 5.9	0.02	0.01	3,801	0.01
Formosa (Taiwan)	18	18	49	49	.....	.....	.....	269	....
Japan	1,122	1,213	3,066	3,101	+ 1.1	0.03	0.03	96,176	0.15
Netherlands, Indies	31,900	41,646	87,158	114,098	+ 30.9	0.93	1.23	1,216,211	1.97
Sakhalin	7,000	7,000	19,126	19,178	— 0.3	0.20	0.21	87,240	0.14
Total Far East	63,285	77,863	172,910	213,323	+ 23.4	1.85	2.30	1,926,028	3.12
ASIA, Total	479,661	587,407	1,310,550	1,609,334	+ 22.8	14.01	17.33	5,297,705	8.58
AUSTRALIA-NEW ZEALAND	2	2	5	5	.....	.....	.....	44	....
WORLD, Undistributed	.....	.....	.....	.....	.....	.....	.....	1,044	....
TOTAL WORLD	3,425,283	3,388,883	9,358,696	9,284,610	— 0.8	100.00	100.00	61,737,998	100.00

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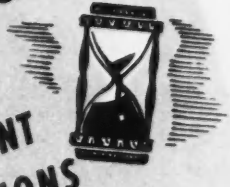

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AU-301

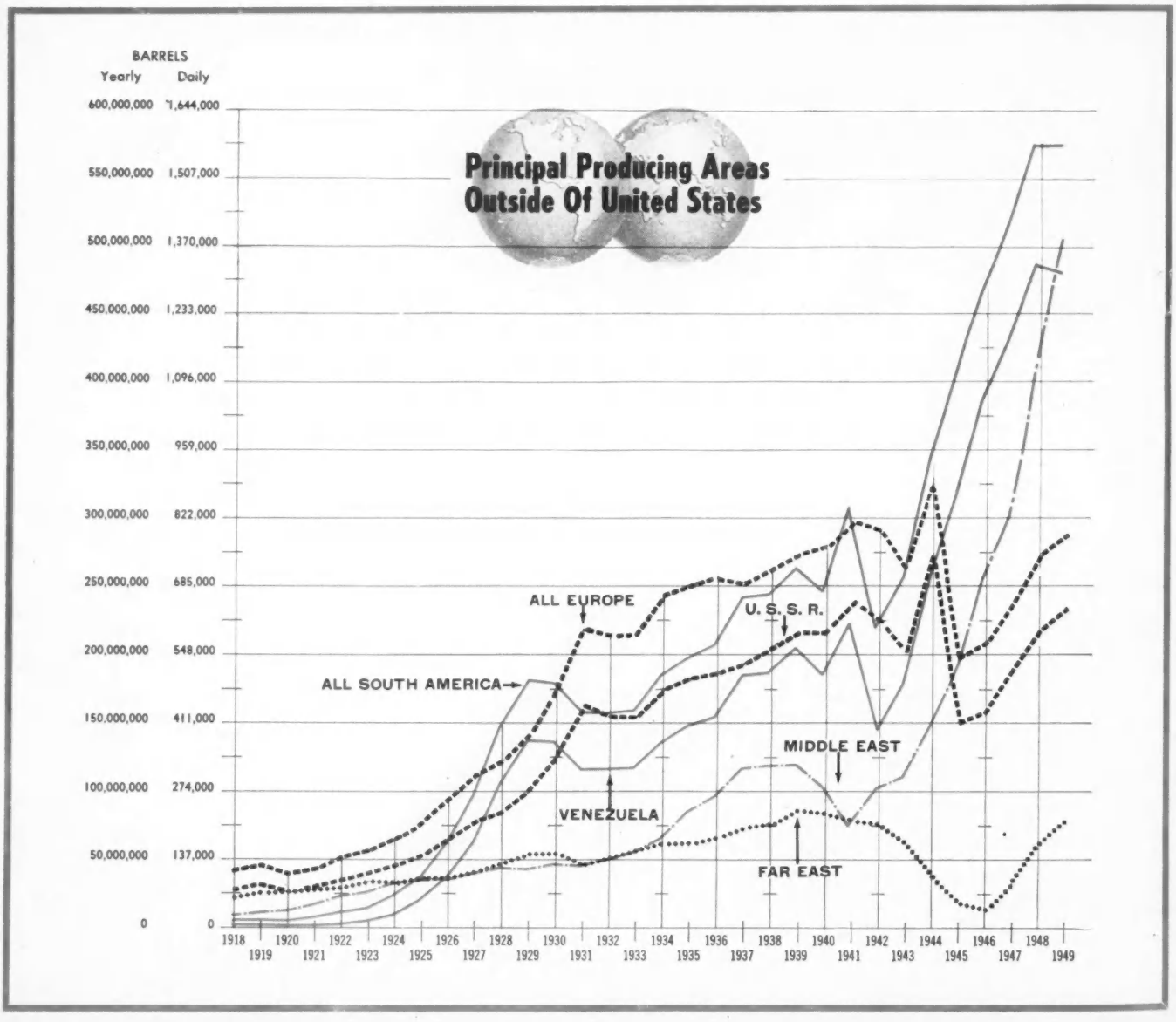
ance percentage wise was in Canada, which lived up to expectations by producing 78.7 percent more in 1949 than in 1948. This increase is due almost entirely to Western Canada, where the Province of Alberta, newly opened as one of the world's major crude reserves, averaged 59,079 barrels daily for the year, and at the close of the year was being held to perhaps half of its potential by lack of a pipe line outlet to Eastern Canada or other areas where the oil might be refined and used. It had already become self-sufficient locally with production, refining capacity and consumption balanced at slightly more than 60,000 barrels daily. Preliminary work is now under way on a pipe line to a terminal on Lake Superior which will furnish an outlet sufficient to double Western Canada's output on completion some time late in 1950 or early in 1951. Reserves developed during 1948 and 1949 are thought already ample to support a much higher Canadian producing rate than is now being maintained, once a market outlet is provided.

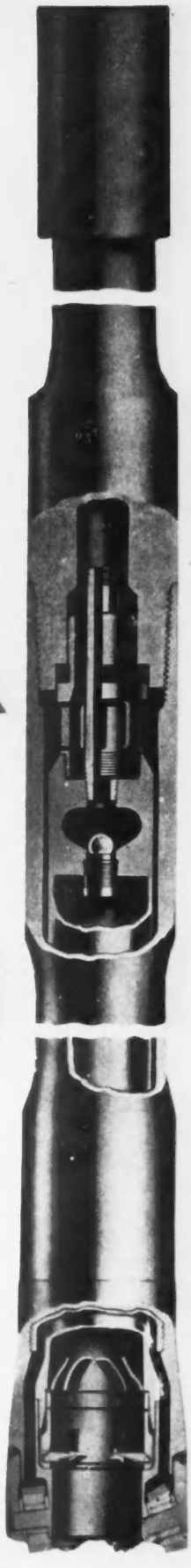
In Mexico, an accelerated drilling campaign allowed maintenance of production in a number of the older producing fields which have been holding their own for some time. At the same time output was boosted in the Poza Rica field, still accounting for nearly two-thirds of the nation's total. Production of 166,359 barrels a day was 6502 barrels a day, or 4.1 percent, more than the 1948 yield. Several new producing fields have been brought in, but none of the recent ones have developed sufficiently to relieve much of the responsibility of Poza Rica field for maintenance of current levels of national output.

Venezuela's Output Down

In South America, Venezuela continued its position as the second producing nation in the world, and the world's largest exporter, although the year-round average of 1,325,490 barrels daily fell 1 percent below the peak of 1948. Despite the fact that its production for each of the last four months of the year exceeded the highest peaks of its producing history, it is likely that the coming year will see output reduced again, and with Venezuela losing large European markets the current outlook is that the reduction will exceed that of the past year. Colder weather than experienced the past two years will be necessary to boost use of heating oil in Northeast U. S. if Venezuela's demand is to stay at peak levels.

In neighboring Colombia, total production climbed to an all-time peak at a daily average of 82,449 barrels, and the yearly total topped 30 million barrels for the first time in history. Producing potential has made no sharp gains. The increased producibility of the newer fields having been offset by declines in output from the DeMares concession. The total yield during 1948 was kept about 6 million barrels below the 1949 figure as a result more of the po-





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litical and labor disturbances than of the ability of fields to produce. One new field was found late in the year, but it is in the upper part of the Magdalena Valley and is unlikely to have an outlet for some time.

Argentina's 65,732-barrel daily output represents a gain of 1.4 percent, but accounts for comparatively little additional total oil and is considerably less than the increase in demand. The nation is feeling the need more and more for new producing areas to furnish flush production not now available in the older fields.

Small increases were also indicated in Peru, Trinidad and Ecuador, but not in sufficient quantities to much more than offset the Venezuela decline. One new nation is to enter the list of producing countries during 1950, when Chile commences shipments from its Cerro Manantiales field. It is already producing into storage, sending some oil through the new pipe line, but has not started shipments into world trade.

The producing trend in the Middle East has followed an entirely different course than that of Venezuela, since its production was not cut back with the beginning of 1949 as was the case in Venezuela. The five Persian Gulf producing nations produced more than ½ billion barrels of oil during the year, a daily average of 1,396,011 barrels, or 22.7 percent more than was produced in 1948. Iran has maintained its position as the No. 1 producing area of the Middle East with a daily average of 555,723 barrels throughout the year, stepping up its output by 6.8 percent over 1948. Saudi Arabia produced an average of 476,737 barrels a day to hold second place in the region while upping its production by about 22 percent. During the year the Middle East produced 15.3 percent of the world's output, compared with 12.2 percent a year previous.

The greatest increase was from Kuwait, which doubled its output during the year when it produced an average of 252,501 barrels daily. Its producing capacity has now been raised well above that average, and on occasion during the year it produced in excess of 300,000 barrels a day. It is still maintaining an active drilling program and its one field is rapidly bearing out the promise of being the world's greatest single crude reserve.

Iraq was able to increase its output over the 1948 total when the new 16-inch pipe line to Tripoli was opened during the latter part of the year, and the year-round average was raised to 81,003 barrels a day.

Egypt, whose producing potential has been increased materially by discoveries of the past several years, produced 42,477 barrels a day during 1949, a figure somewhat below its present capabilities, but believed to have been due to difficulties with transportation and refining capacity. The trend toward nationalism is evident in Egypt as well as many other countries and plans for increasing capacity to handle more production have been blocked by new regulations adopted toward the end of 1948.

A further increase in Middle East production is looked for during 1950 as crude from that source continues to supplant Western Hemisphere oil, particularly in sterling areas; and Qatar, which has never been produced commercially, will contribute toward the total this year. With five wells ready for production, the new pipe line from the Dukhan field was placed in operation at the end of 1949, and shipments are expected to start at a rate of several thousand barrels daily.

Far East's Position

The Far East also improved its position during 1949 as production from British Borneo and the remainder of Indonesia was increased by 23.2 and 30.9 percent, respectively. Substantial percentage gains were registered in India and Pakistan, but these were relatively unimportant as to volume, since together they accounted for only a little more than 7000 barrels daily. On the other hand, British Borneo and Indonesia have again attained the producing level of prewar days. The former, which includes Sarawak and Brunei, averaged 67,750 barrels daily throughout the year, and were producing at more than 72,000 barrels a day at the end of the year, or approximately 2½ times the prewar level. Indonesia produced 114,098 barrels a day during the year, slightly under the 1939 rate, but the areas now producing are above the rates of ten years ago, since much of the territory which included many important fields is still inaccessible due to political disturbances. Included with the output from Indonesia is about 4800 barrels daily from Netherlands New Guinea, which started producing commercially just before the end of 1948, and is just completing its first full year of production.

Production from Japan, declining from the older fields, has been bolstered slightly by new production discovered during the past two years, but is still only a fraction of local consumption at 3100 barrels daily.

With the exception of Germany and the Netherlands, production from Western European countries has failed to show appreciable gains, and in many instances is declining. Germany, due to intensive development of the fields in the Emsland, and to opening of flank production around some of the salt-dome structures in the older areas, boosted its production by 34.3 percent with almost all the increase coming from Emsland fields. Total production averaged 16,315 barrels daily during 1949, with new production peaks set during the late months of the year. The wildcat program paid off with several discoveries which contributed new oil to the total. Further increases can be looked for in 1950.

In The Netherlands, the single Dutch field of Schoonebeek reached its top efficient producing level at about 11,700 barrels a day, and is expected to hold this output without too much trouble with current efficient production methods on the part of the operating partnership composed of the Shell Group and the Standard Oil Company (N. J.).

Although little detailed information is released from Austrian territory under control of the Russians, it is estimated that new flush production from the Matzen field was more than enough to offset the natural decline of the older fields, and resulted in an over-all gain of about 3 percent in output.

Reports allowed by censorship indicate failure of Roumanian production to respond to current efforts, with the result that a decline of about 2.6 percent is likely as compared with 1948. Production during 1949 was just over 82,000 barrels daily, a decline of about 2200 barrels a day in yield.

Reports from the Soviet Union itself claim substantial increases in output as compared with various periods last year. Consideration of factors known prior to the information blackout, applied to Soviet claims, would indicate perhaps as much as 7.5 percent increase over the 1948 estimate of production, with a resultant indicated output of just over 640,000 barrels a day.

(See Tables on 202-204-208)

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World Crude Oil Production, By Countries, By Years (Part 1)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

YEAR	World Total	Percent Produced by U.S.	NORTH AMERICA					SOUTH AMERICA									
			Canada	Mexico	United States	Cuba	Total North America	Argentina	Barbados	Bolivia	Brazil	Colombia	Ecuador	Peru	Trinidad	Venezuela	Total South America
1857	2	....															
1858	4	....															
1859	6	31			2		2										
1860	509	98			500		500										
1861	2,131	99			2,114		2,114										
1862	3,092	99	12		3,057		3,069										
1863	2,763	94	83		2,611		2,694										
1864	2,304	92	90		2,116		2,206										
1865	2,716	92	110		2,498		2,608										
1866	3,899	92	175		3,598		3,773										
1867	3,709	90	190		3,347		3,537										
1868	3,990	91	200		3,646		3,846										
1869	4,696	90	220		4,215		4,435										
1870	5,799	91	250		5,261		5,511										
1871	5,730	91	270		5,205		5,475										
1872	6,877	92	308		6,293		6,601										
1873	10,838	91	365		9,894		10,259										
1874	11,933	92	169		10,927		11,096										
1875	9,977	88	226		8,788		9,008										
1876	11,051	83	312		9,133		9,445										
1877	15,754	85	312		13,350		13,662										
1878	18,417	84	312		15,397		15,709										
1879	23,601	84	575		19,914		20,489										
1880	30,018	88	350		26,286		26,636										
1881	31,993	86	275		27,661		27,936										
1882	35,704	85	275		30,350		30,625										
1883	30,255	78	250		23,450		23,700										
1884	35,969	67	250		24,218		24,468										
1885	36,765	59	250		21,859		22,109										
1886	47,243	59	584		28,065		28,649										
1887	47,807	59	526		28,283		28,809										
1888	52,165	53	695		27,612		28,307										
1889	61,507	57	705		35,164		35,869										
1890	76,633	60	795		45,824		46,619										
1891	91,100	60	755		54,293		55,048										
1892	88,739	57	780		50,515		51,295										
1893	92,038	53	798		48,431		49,229										
1894	89,337	55	829		49,344		50,173										
1895	103,692	51	726		52,892		53,618										
1896	114,199	53	727		60,960		61,687							47			47
1897	121,993	50	710		60,476		61,186							71			71
1898	124,979	44	758		55,364		56,122							71			71
1899	131,147	44	808		57,071		57,879							89			89
1900	149,137	43	913		63,621		64,534							274			274
1901	167,440	41	757	10	69,389		70,156							275			275
1902	181,809	49	531	40	88,767		89,338							287			287
1903	194,879	52	487	75	100,461		101,023							278			278
1904	217,948	54	553	126	117,081		117,760							290			290
1905	215,091	63	634	251	134,717		135,602							373			373
1906	213,263	59	569	502	126,494		127,565							531			531
1907	263,957	63	789	1,005	166,095		167,889	*						751			751
1908	285,287	63	528	3,933	178,527		182,988	12						945	*		957
1909	298,709	61	421	2,714	183,171		186,306	18						1,411	57		1,486
1910	327,763	64	316	3,634	209,557		213,507	20						1,258	143		1,421
1911	344,361	64	291	12,553	220,449		233,293	13						1,465	285		1,763
1912	352,443	63	243	16,558	222,935		239,736	47						1,752	437		2,236
1913	385,345	64	228	25,696	248,446		274,370	131						2,071	504		2,706
1914	407,544	65	215	26,235	265,763		292,213	276						1,837	644		2,757
1915	432,033	65	215	32,911	281,104		314,230	513						2,579	750		3,842
1916	457,509	66	198	40,546	300,767		341,511	867						2,593	929		4,389
1917	502,891	67	214	55,293	335,316		390,823	1,218					57	2,577	1,602	130	5,574
1918	503,515	71	305	63,828	355,928		420,061	1,353					†60	2,527	2,082	333	6,355
1919	555,875	68	241	87,073	378,367		465,681	1,331					†60	2,628	1,841	425	6,285
1920	688,884	64	196	157,069	442,929		600,194	1,651					†60	2,817	2,083	457	7,068
1921	766,002	62	188	193,398	472,183		665,769	2,036				67	†60	3,699	:2,354	1,433	9,649
1922	858,898	65	179	182,278	557,531		739,988	2,866				323	†60	5,314	2,445	2,201	13,209
1923	1,015,736	72	170	149,585	732,407		882,162	3,400				425	87	5,699	3,051	4,201	16,863
1924	1,014,318	70	161	139,678	713,940		853,779	4,639				445	†100	8,379	4,057	9,042	26,662
1925	1,068,933	71	332	115,515	763,743		879,590	6,336				1,007	160	9,232	4,387	19,687	40,809
1926	1,096,823	70	364	90,421	770,874		861,659	7,851				6,444	214	10,762	4,971	36,911	67,153
1927	1,262,582	71	477	64,121	901,129		965,727	8,630				15,014	537	10,127	5,380	63,134	102,822
1928	1,324,774	68	624	50,151	901,474		952,249	9,070				19,897	1,084	12,006	7,684	105,749	155,490
1929	1,485,867	68	1,117	44,688	1,007,323		1,053,128	9,391		*		20,385	1,381	13,422	8,716	137,472	190,767
1930	1,410,037	64	1,522	39,530	898,011		939,063	9,002		56		20,346	1,553	12,449	9,419	136,669	189,494
1931	1,372,532	62	1,543	33,039	851,081		885,663	11,709		25		18,237	1,762	10,089	9,744	116,613	168,179
1932	1,309,677	60	1,044	32,805	785,159		819,008	13,139		44		16,414	1,597	9,899	10,126	116,541	167,760
1933	1,442,146	63	1,145	34,001	905,656	23	940,825	13,691		112		13,158	1,620	13,257	9,561	117,720	169,119
1934	1,522,281	60	1,417	38,172	908,065	28	947,682	14,024		159		17,341	1,637	16,314	10,894	136,103	196,472
1935	1,654,488	60	1,447	40,241	996,596	47	1,038,331	14,297		164		17,598	1,732	17,067	11,671	148,254	210,783
1936	1,791,540	61	1,500	41,028	1,099,687	62	1,142,277	15,458		105		18,756	1,942	17,593	13,237	154,794	221,885
1937	2,039,231	63	2,944	46,907	1,279,160	33	1,329,044	16,355		122		20,599	2,161	17,457	15,503	186,230	258,427
1938	1,988,041	61	6,966	38,506	1,214,355	78	1,259,905	17,076		226		21,582	2,246	15,839	17,737	188,174	262,880
1939	2,086,160	60.6	7,838	42,898	1,264,962	112	1,315,810	18,613		215		23,857	2,313	13,508	19,270	206,470	284,246
1940	2,149,821	62.9	8,591	44,036	1,353,214	142	1,405,983	20,609		288	2	25,593	2,349	12,126	22,227	185,570	268,764
1941	2,220,657	63.1	10,134	42,196	1,402,228	150	1,454,708	21,873		235	3	24,553	1,557	11,935	20,506	228,430	309,092
1942	2,093,100	66.2	10,365	34,815	1,386,645	151	1,431,976	23,704	2	308	33	10,487	2,278	13,629	22,069	147,675	220,185
1943	2,256,625	66.7	10,052	35,163	1,505,613	107	1,550,935	27,714	2	334	48	13,261	2,315	14,654	21,385	177,631	257,344
1944	2,592,514	64.7	10,099	38,203	1,677,904	109	1,726,315	24,230	1	314	58	22,291	2,967	14,389	22,139	257,046	343,435
1945	2,594,959	66.0	8,483	43,547	1,713,655	149	1,765,834	22,881	2	382	79	22,449	2,664	13,744	21,093	323,156	406,450
1946	2,745,667	63.1	7,586	49,235	1,733,939	269	1,791,029	20,604	1	363	67	22,118	2,323	12,468	20,233	388,486	466,663
1947	3,021,668	61.5	7,692	56,284	1,856,987	300	1,921,263	21,846	*	377	97	24,794	2,282	12,764	20,521	434,905	517,586
1948	3,425,283	58.9	12,098	58,508	2,016,282	159	2,087,047	23,734	*	464	144	23,792	2,563	14,069	20,111	490,015	574,892
1949‡	3,388,883	54.3	21,564	60,721	1,839,615	161	1,922,061	23,992	*	671	107	30,094	2,665	14,500	20,644	483,804	576,477
Total	61,737,998	63.7	162,505	2,409,722	38,939,286	2,080	41,513,593	436,220	8	4,964	638	471,327	46,446	386,187	392,492	5,005,451	6,743,733

* Less than 1,000 barrels. † Approximate production. ‡ Estimated by WORLD OIL.

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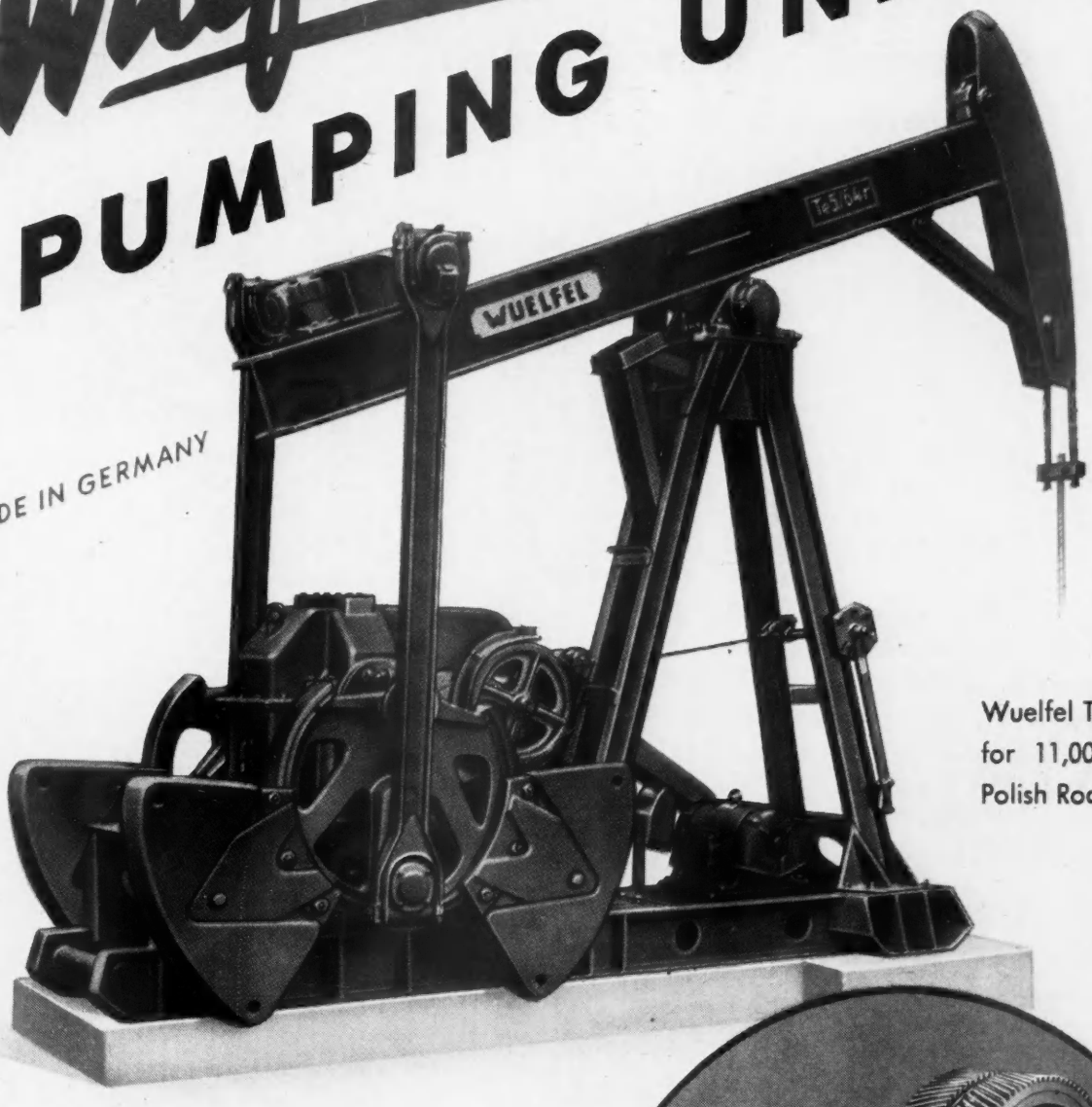

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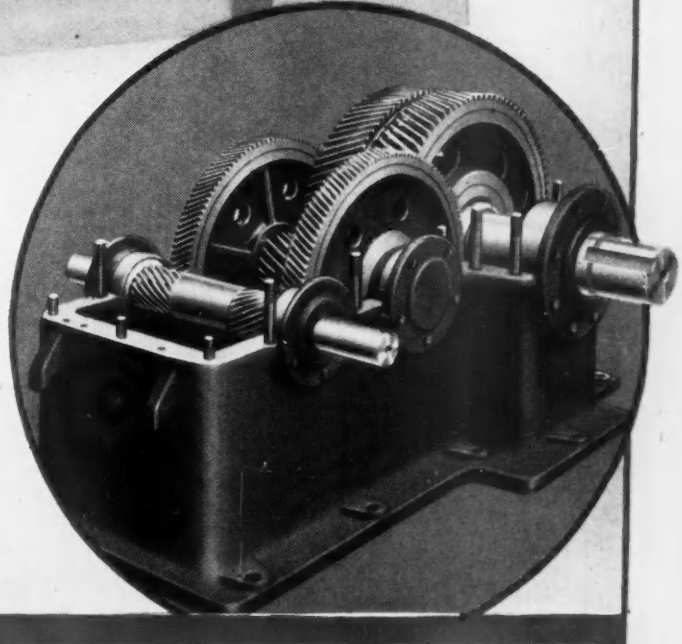

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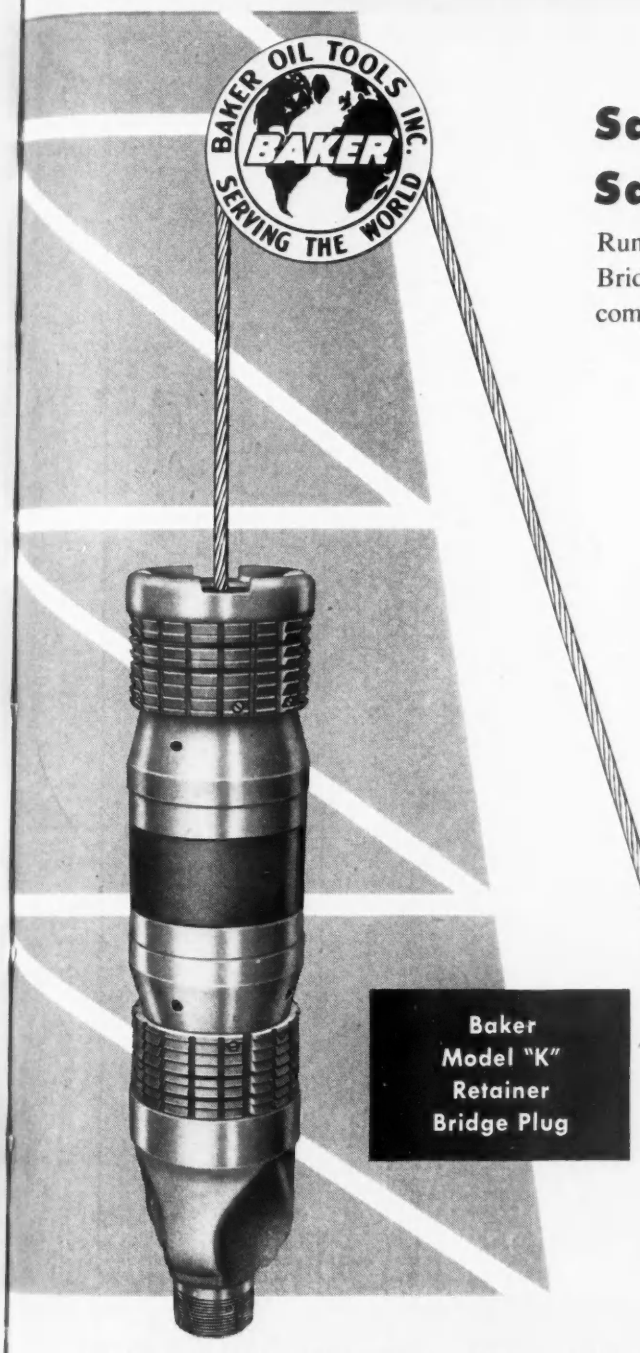
World Crude Oil Production, By Countries, By Years (Part 2)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Mineral Yearbook*, except as otherwise indicated)

	EUROPE													AFRICA			
YEAR	Albania	Austria	Czecho-slovakia	Great Britian	France	Ger-many	Hun-gary	Italy	Nether-lands	Poland	Rou-mania	‡U.S.S.R. (Russia)	Yugo-slavia	‡Total Europe	Egypt	Algeria	Other Africa	Total Africa
1857											2			2				
1858											4			4				
1859											4			4				
1860								•			9			9				
1861								•			17			17				
1862								•			23			23				
1863								•			28	41		69				
1864								•			33	65		98				
1865								2			39	67		108				
1866								1			42	83		126				
1867								1			51	120		172				
1868								•			56	88		144				
1869								•			59	202		261				
1870								•			84	204		288				
1871								•			90	165		255				
1872								•			91	185		276				
1873								•			104	475		579				
1874								1		150	103	583		837				
1875								1		158	108	697		964				
1876								3		164	111	1,321		1,599				
1877								3		170	108	1,801		2,082				
1878								4		176	109	2,401		2,690				
1879								3		215	110	2,761		3,089				
1880						9		2		229	115	3,001		3,356				
1881						29		1		287	122	3,601		4,040				
1882						58		2		330	136	4,538		5,064				
1883						27		2		365	139	6,002		6,535				
1884						46		3		408	211	10,805		11,473				
1885						41		2		465	193	13,925		14,626				
1886						74		2		306	168	18,006		18,556				
1887						74		1		344	182	18,368		18,969				
1888						85		1		467	219	23,049		23,821				
1889						68		1		515	298	24,609		25,491				
1890						108		3		659	383	28,691		29,844				
1891						109		8		631	488	34,573		35,809				
1892						101		18		646	593	35,775		37,133				
1893						100		19		693	535	40,457		41,804				
1894						123		21		949	508	36,375		37,976				
1895						121		26		1,453	576	46,140		48,316				
1896						145		18		2,444	543	47,221		50,371				
1897						166		14		2,226	571	54,399		57,376				
1898						184		15		2,376	776	61,610		64,961				
1899						192		16		2,314	1,426	65,955		69,903				
1900						358		12		2,347	1,629	75,780		80,126				
1901						314		16		3,251	1,678	85,168		90,427				
1902						354		19		4,142	2,060	80,540		87,115				
1903						446		18		5,235	2,763	75,591		84,053				
1904						637		26		5,947	3,599	78,537		88,746				
1905						561		44		5,766	4,421	54,960		65,752				
1906						579		54		5,468	6,378	58,897		71,376				
1907						757		60		8,456	8,118	61,851		79,242				
1908						1,009		51		12,612	8,252	62,187		84,111				
1909						1,019		42		14,933	9,327	65,970		91,291				
1910						1,032		51		12,673	9,724	70,337		93,817				
1911						1,017		75		10,519	11,108	66,184		88,903	21			21
1912						1,031		54		8,535	12,976	68,019		90,615	214			214
1913						857		47		7,818	13,555	62,834		85,111	98			98
1914						781		40		6,436	12,827	67,020		87,104	753	1		754
1915						703		44		5,352	12,030	68,548		86,677	212	4		216
1916						656		51		6,587	8,945	65,817		82,056	404	8		412
1917					§	642		41		6,228	3,721	63,072		73,704	943	9		952
1918					363	270		35		6,032	8,730	27,168		42,598	1,935	7		1,942
1919			48	2	334	265		35		6,096	6,618	31,752		45,150	1,517	5		1,522
1920			69	3	356	246		35		5,607	7,435	25,430		39,181	1,042	4		1,046
1921			94	3	389	274		32		5,167	8,368	28,968		43,295	1,255	3		1,258
1922			120	1	496	319		31		5,227	9,843	35,692		51,729	1,188	9		1,197
1923			74	1	494	346		34		5,402	10,867	39,147		56,365	1,054	9		1,063
1924			76	2	497	406		39		5,657	13,369	45,355		65,401	1,122	11		1,133
1925			158	3	459	541		61		5,960	16,650	52,448		76,280	1,226	12		1,238
1926			150	2	478	653		41		5,844	23,314	64,311		94,793	1,188	9		1,197
1927			112	2	504	663		47		5,342	26,368	77,018		110,056	1,267	8		1,275
1928			94	1	512	630		46		5,492	30,773	†84,745		122,293	1,842	8		1,850
1929			93		535	704		45		4,988	34,758	†99,507		140,630	1,868	20		1,888
1930			157	•	523	1,182		59		4,904	41,624	†125,555		174,004	1,996	16		2,012
1931			134	★	520	1,606		124		4,662	49,127	162,842		219,015	2,038	★		2,038
1932			126	★	530	1,608		208		4,116	53,815	154,367		214,770	1,895	★		1,895
1933	11		122	★	562	1,665		204		4,072	54,020	154,840		215,496	1,663	★		1,663
1934	10		178	★	557	2,187		151		3,913	62,063	174,318		243,377	1,546	★		1,546
1935	41	44	133	★	541	2,996		119		3,812	61,310	182,386	2	251,384	1,301	★	4	1,305
1936	273	50	127	★	503	3,115		123		3,789	63,659	186,206	1	257,846	1,278	★	4	1,282
1937	619	221	123	★	502	3,176	16	110		3,716	52,452	193,241	4	254,180	1,196	★	22	1,218
1938	752	383	130	★	513	3,861	288	101		3,763	48,487	204,956	9	263,243	1,581	★	27	1,608
1939	934	1,240	120		500	4,487	1,103	91		3,898	45,648	216,866	10	274,897	4,666	★	27	4,693
1940	1,497	2,808	163	124	496	7,371	1,881	85		3,891	43,168	218,600	10	280,094	6,505	★	27	6,532
1941	1,334	4,238	183	223	414	6,303	3,183	95		1,793	40,517	238,150	10	296,443	8,546	★	27	8,573
1942	1,601	5,899	271	605	463	5,191	5,037	101		2,794	42,094	227,470	10	291,536	8,275	★	41	8,316
1943	1,001	7,478	200	839	356	4,973	6,347	75		3,500	39,182	200,750	10	264,711	8,953	★	39	8,992
1944	334	8,218	185	703	300	6,154	6,204	75	14	3,000	26,191	275,000	500	326,878	9,416	★	32	9,448
1945	267	3,074	91	532	197	3,935	5,018	75	41	750	34,772	148,953	450	198,155	9,406	★	26	9,432
1946	1,000	5,734	196	412	367	4,539	5,146	82	435	866	31,434	157,673	400	208,284	9,070	★	20	9,090
1947	1,800	6,285	210	351	363	4,035	4,330	80	1,478	951	28,552	187,463	365	236,263	8,627	★	23	8,650
1948	1,400	6,149	204	323	370	4,446	3,542	70	3,444	1,000	30,868	218,000	365	270,181	13,398	★	102	13,500
1949I	1,250	6,315	209	318	375	5,955	3,570	75	4,302	995	29,980	233,625	365	287,334	15,504	★	98	15,602
Total	14,124	58,136	4,350	4,450	14,369	98,715	45,665	3,523	9,714	278,444	1,218,734	6,292,473	2,511	8,045,208	136,009	143	519	136,671

‡ Includes field in Russian Asia other than Sakhalin. • Less than 1,000 barrels. ★ No more data available. § France's earlier production credited to Germany. † Year ended September 30. I Estimated by WORLD OIL.

now Run and Set on a Wire Line



Baker Model "K" Retainer Bridge Plug

Safe, Positive Operation Saves Time and Money

Running and setting a Baker Retainer Production Packer, or a Baker Bridge Plug on a wire line provides these important advantages in comparison with running on drill pipe or tubing:

(a) Costly rig time is saved, and wear and tear on tubular goods and rig equipment is eliminated.

(b) There is less likelihood of premature setting.

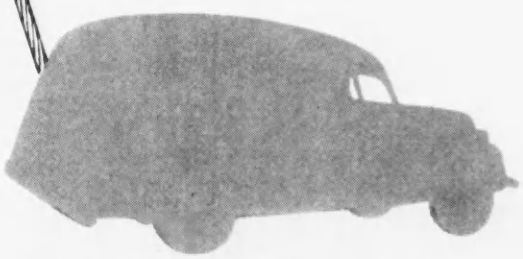
(c) The use of an electrical conductor cable, equipped with a device to locate collars, insures setting of the Packer or Bridge Plug in the desired section, and not at the joint.

(d) When the well is to be gun-perforated in conjunction with the setting of a Baker Retainer Bridge Plug or a Baker Packer, only one set-up is required by the service company.

(e) More uniform setting is secured than when an upstrain on the tubing is required.

Successful setting of the Baker Production Packer or the Baker Wire Line Bridge Plug is accomplished by employing a Baker Wire Line Pressure Setting Assembly in which products of combustion (whose rate of burning is retarded) are utilized for the gradual development of pressure as a controlled motive force. This force actuates the Setting Assembly which sets and packs-off the Packer or Bridge Plug. The Setting Assembly is then removed from the hole.

BAKER OIL TOOLS, INC.
Houston • Los Angeles • New York



McCULLOUGH TOOL CO., California, Colorado, Illinois, Kansas, Louisiana, Mississippi, Montana, New Mexico, Oklahoma, Texas, Wyoming

PERFORATING GUNS ATLAS CORP., Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma, Texas, Canada

SCHLUMBERGER WELL SURVEYING CORP., Arkansas, Illinois, Kansas, Louisiana, Michigan, Mississippi, Oklahoma, Texas, West Virginia

SPARTAN TOOL AND SERVICE CO., Louisiana, Oklahoma, Texas

WELEX JET SERVICES, INC., Oklahoma, Texas

THE WESTERN COMPANY, New Mexico, Texas

World Crude Oil Production, By Countries, By Years (Part 3)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Mineral Yearbook*, except as otherwise indicated)

	ASIA—Middle East						ASIA—Far East													
								⧗Burma-India-Pakistan				¶								
Year	Bahrein	Iran	Iraq	Kuwait	Saudi Arabia	Total Middle East	British Borneo	Burma	Pakistan	India	China	For-mosa	Japan	Nether-land India	Sak-halin	Total Far East	*Total Asia	Aus-tra-lia-N.Z.	Rest of World
1857																			
1858																			
1859																			
1860									..										
1861																			
1862																			
1863																			
1864																			
1865																			
1866																			
1867																			
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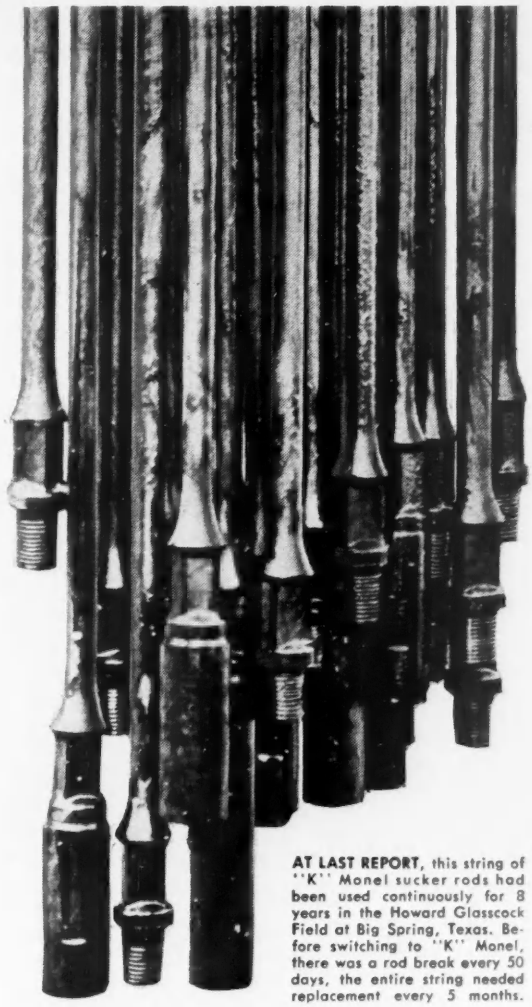
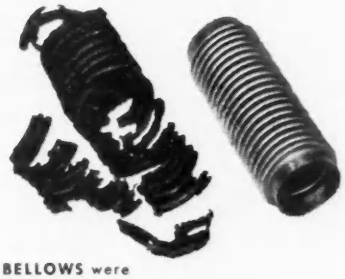
1869																			
1870																			
1871																			
1872																			
1873																			
1874																			
1875													5			5	5		
1876													7			7	7		
1877													10			10	10		
1878													18			18	18		
1879													23			23	23		
1880													26			26	26		
1881													17			17	17		
1882													15			15	15		
1883													20			20	20		
1884													28			28	28		
1885													30			30	30		
1886													38			38	38		
1887													29			29	29		
1888									..				37			37	37		
1889									94				53			147	147		
1890									118				52			170	170		
1891									190				53			243	243		
1892									242				69			311	311		
1893									299				106	600		1,005	1,005		
1894									327				173	688		1,188	1,188		
1895									372				170	1,216		1,758	1,758		
1896									430				237	1,427		2,094	2,094		
1897									546				262	2,552		3,360	3,360		
1898									542				319	2,964		3,825	3,825		
1899									941				539	1,796		3,276	3,276		
1900									1,079				871	2,253		4,203	4,203		
1901									1,431				1,117	4,014		6,562	6,562		20
1902									1,617				1,117	4,014		5,043	5,043		26
1903									2,510				1,200	5,770		9,489	9,489		36
1904									3,385				1,219	6,508		11,112	11,112		40
1905									4,137				1,347	7,850		13,334	13,334		30
1906									4,016				1,564	8,181		13,761	13,761		30
1907									4,344				1,718	9,983		16,035	16,045		30
1908									5,047				1,871	10,283		17,021	17,201		30
1909									6,677				1,887	11,042		19,606	19,606		20
1910									6,138				1,829	11,031		18,998	18,998		20
1911									6,451				1,737	12,173		20,361	20,361		20
1912									7,117				1,659	10,846		19,622	19,622		20
1913		1,857				1,857	141		7,930				1,940	11,172		21,183	23,040		20
1914		2,910				2,910	318		7,410				2,636	11,422		21,786	24,696		20
1915		3,616				3,616	392		8,202				2,928	11,920		23,442	27,058		10
1916		4,477				4,477	629		8,491				2,963	12,547		24,630	29,107		25
1917		7,147				7,147	542		8,079				2,861	13,180		24,662	31,809		29
1918		8,623				8,623	504		8,188				2,441	12,778		23,911	32,534		25
1919		10,139				10,139	596		8,736				2,238	15,508		27,078	37,217		20
1920		12,230				12,230	1,020		8,375				2,221	17,529		29,145	41,375		20
1921		16,673				16,673	1,411		8,734				2,233	16,958	2	29,338	46,011		20
1922		22,247				22,247	2,849		8,529				2,055	17,066	7	30,506	52,753		22
1923		25,230				25,230	3,940		8,406				1,804	19,870	9	34,029	59,259		24
1924		32,373				32,373	4,163		8,416				1,814	20,473	80	34,946	67,319		24
1925		35,038				35,038	4,257		8,274				1,915	21,422	87	35,955	70,993		23
1927		35,842				35,842	4,942		8,011				1,785	21,243	181	36,162	72,004		17
1927		39,688	338			40,026	4,943		8,032				1,780	27,459	440	42,663	82,689		13
1928		43,461	713			44,174	§5,223		8,741				1,944	32,118	677	48,703	92,877		15
1929		42,145	798			42,943	5,290		8,747				2,023	39,279	‡1,134	56,473	99,416		38
1930		45,828	913			46,741	4,907		8,292				1,950	41,729	‡1,805	58,683	105,424		40
1931		44,376	830			45,206	3,854		8,200				2,050	35,539	2,734	52,377	97,583		54
1932		49,471	836			50,307	3,796		8,817				1,630	39,001	2,631	55,875	106,182		62
1933	31	54,392	917			55,340	4,490		8,743				1,455	42,606	2,338	59,632	114,972		71
1934	285	57,851	7,689			65,825	5,140		10,503				1,834	46,925	2,881	67,283	133,108		96
1935	1,265	57,273	27,408			85,946	5,546	7,181	⧗	2,038			2,249	47,171	2,545	66,730	152,676	5	4
1936	4,645	62,718	30,406		20	97,789	5,209	7,588	⧗	1,978			2,440	50,025	3,212	70,452	168,241	5	4
1937	7,762	77,804	31,836		65	117,467	6,009	7,848	⧗	2,162			2,488	56,724	3,656	78,887	196,354	4	4
1938	8,298	78,372	32,643		495	119,808	6,913	7,538	⧗	2,488			2,511	57,318	‡3,821	80,589	200,397	4	4
1939	7,589	78,151	30,791		3,934	120,465	7,097	7,873	⧗	2,327	4		2,654	62,087	4,000	86,042	206,507	3	4
1940	7,074	66,317	24,225		5,075	102,691	7,047	7,731	⧗	2,302	10		2,639	62,011	4,000	85,740	188,431	3	14
1941	6,794	50,777	12,650		4,310	74,531	6,864	7,762	⧗	2,899	87	62	1,929	53,704	4,000	77,307	151,338	3	
1942	6,241	72,256	19,726		4,530	102,753	3,000	2,500	⧗	2,792	340	48	1,652	24,000	4,000	38,332	141,085	2	
1943	6,572	74,612	24,848		4,868	110,900	4,500	1,000	⧗	2,735	447	38	1,727	48,294	5,000	63,741	174,641	2	
1944	6,714	102,045	30,943		7,794	147,496	6,000	750	⧗	2,784	505	40	1,601	22,260	5,000	38,940	186,436	2	
1945	7,309	130,526	35,112		21,311	194,258	2,100	725	⧗	2,363	484	11	1,544	7,600	6,000	20,827	215,085	3	
1946	8,010	146,819	35,665	5,931	59,944	256,369	2,050	15	⧗	2,193	513	16	1,343	2,100	6,000	14,230	270,599	2	
1947	9,411	154,998	35,834	16,225	89,852	306,320	12,970	59	330	1,533	378	18	1,276	8,020	7,000	31,584	337,904	2	
1948	10,915	190,395	26,115	46,098	142,853	416,376	20,120	360	490	1,742	533	18	1,122	31,900	7,000	63,285	479,661	2	
1949‡	10,967	202,839	29,566	92,163	174,009	509,544	24,729	256	675	1,907	500	18	1,132	41,646	7,000	77,863	587,407	2	
Total.	109,882	2,141,516	440,802	160,417	519,060	3,371,677	183,501		338,830		3,801	269	96,176	1,216,211	87,240	1,926,028	5,297,705	44	1,044

⧗ Separation of British India and Burma prior to 1935 not available from U. S. Bureau of Mines data here used. Data by L. Dudley Stamp in "Petroleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulatives through 1934 as follows: Burma 184,528, India 20,756. Pakistan included with India prior to 1947. *Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. ‡ Year ended September 30. † Approximate production. § Beginning of production in Brunei. ¶ Formosa included with Japan prior to 1941. ‡ Estimated by WORLD OIL.



AT LAST REPORT, this string of "K" Monel sucker rods had been used continuously for 8 years in the Howard Glasscock Field at Big Spring, Texas. Before switching to "K" Monel, there was a rod break every 50 days, the entire string needed replacement every 5 months.



THESE TWO BELLOWS were used in a gas lift valve in the same sour well. Photo at left shows condition of the best previous bellows after 19 days. Compare this with other photo, taken of a Monel bellows when it was removed for inspection after 141 days of use.

BALL AND SEAT VALVE of "K" Monel. At depth of 3,500 feet, pulsating 28,000 times a day, and subjected to the action of corrosive crude, one of these heat treated "K" Monel valves lasted 10 months, 22 days. Alloy steel valve in same well lasted only 21 days.

Corrosive wells can be operated profitably with equipment made of Monel® and "K"® Monel.

This has been proved time and again—even in the sour gas areas of West Texas and New Mexico.

It is easy to see why. Monel, for example, is strong and tough. It is highly resistant to corrosion by brine and sour crude. It withstands the cutting action of high pressure gas, and the abrasive effects of entrained solids.

"K" Monel has the same characteristics, coupled with the added advantages of even greater strength and hardness. It is non-magnetic. By heat treatment, its tensile strength can be developed to 140-170,000 psi, and its hardness to 265-320 Brinell.

These important facts about Monel and "K" Monel are helpful guides in . . .

Choosing the RIGHT EQUIPMENT *for* CORROSIVE WELLS

Both alloys are used for parts subject to alternating stresses in the presence of corrosives. Their retention of good fatigue strength is particularly evident in lengthened equipment life. Under varied conditions of temperature, pressure and velocity, Monel and "K" Monel stand up where other materials frequently *give* up.

Our illustrated booklet, ***Controlling Corrosion in Petroleum Production Equipment,*** tells how you can put Monel, "K" Monel and other INCO Nickel Alloys to work for you. It brings you the details of typical performance and service records like the three shown on this page. It contains individual sections dealing with exploration and drilling, pumping, and gas control.

The booklet tells, too, how you can get free technical advice on the selection of materials for severe service, and contains a listing of valuable bulletins and other literature that have been prepared for your use. Write us—*now*—for your copy. No obligation.

• • •

USE MONEL OR "K" MONEL TO CUT REPLACEMENTS OF . . .

Ball and Seat Valves . . . Chokes . . . Drill Collars . . . Gas Lifts . . . Gauges . . . Instrument Parts . . . Polished Rods . . . Pump Shafts . . . Springs . . . Subs . . . Sucker Rods . . . Valve Stems . . . Wire Lines . . . Working Barrels . . . and many other items of oil field equipment.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
INCO
TRADE MARK

MONEL . . . "K" MONEL . . . YOUR PARTNERS IN PROGRESS

Venezuela Leads in INTERNATIONAL MOVEMENT Of Crude

VAST quantities of crude move each year from producing regions through international trade channels to refineries in other countries. During 1948, latest year for which figures are available, intercountry movement of crude totaled 709,461,000 barrels. This was in addition to large quantities of refined products which also move annually through international trade.

Venezuela and the Persian Gulf countries of the Middle East are the principal shippers of crude, their combined total accounting for 85 percent of all the crude petroleum which moved in international trade during 1948.

Venezuela ranked first in exports to other countries, shipping 437,700,000 barrels in 1948, or 61.7 percent of the international movement of crude. However, the bulk of Venezuela's crude moved to refineries in nearby Netherland West Indies, from which point it entered international trade circles as refined products. Outside of the Netherland West Indies, the largest importer of Venezuelan crude was the U. S., which received 93,769,000 barrels. The next largest destination for Venezuelan crude was Canada with 37,567,000 barrels, followed by Europe with 30,928,000 barrels.

The Persian Gulf region, excluding Iran, shipped 166,456,000 barrels of crude to other countries in 1948. This represented 23.5 percent of the world's international movement of crude.

World Movement of Crude Petroleum in International Trade, 1948

Source: U. S. Bureau of Mines

(THOUSANDS OF BARRELS)

	United States	Mexico	Trinidad	Colombia	Ecuador and Peru	Venezuela	Iran	Persian Gulf	British Borneo and Indonesia	Other	Total
Imported by:											
Canada	33,071	213	2,357	.....	.....	37,567	485	3,642	.....	....	77,335
Cuba	1,506	.....	.....	.....	.....	.....	.....	.....	.....	....	1,506
Mexico	62	.....	.....	.....	.....	.....	.....	.....	.....	....	62
Netherland W. Indies	.....	.....	.....	5,186	.....	270,992	.....	.....	.....	....	276,178
Trinidad	.....	.....	.....	3,547	.....	5,310	.....	.....	.....	....	8,857
United States	.....	3,601	.....	8,542	.....	93,769	4,507	18,674	.....	....	129,093
Total North America	34,639	3,814	2,357	17,275	.....	407,638	4,992	22,316	.....	....	493,031
Argentina	1,300*	.....	.....	600*	1,400*	7,300*	250*	2,100*	.....	150*	13,100*
Brazil	.....	.....	.....	.....	.....	568	.....	.....	.....	....	568
Uruguay	.....	.....	.....	.....	232	3,490	.....	1,007*	.....	....	4,729
Total South America	1,300	.....	.....	600	1,632	11,358	250	3,107	.....	150	18,397
Belgium and Luxemburg	.....	.....	.....	.....	.....	1,507	.....	.....	.....	743	2,250
Denmark	.....	.....	.....	.....	.....	133	.....	.....	.....	....	133
France	2,865	.....	.....	.....	.....	10,671	5,602	33,709	.....	1,806	54,653
Germany	.....	.....	.....	.....	.....	296	.....	1,020*	.....	....	1,316
Italy and Trieste	.....	.....	.....	.....	.....	428	4,645	11,122	.....	4	16,199
Netherlands	.....	951	.....	.....	.....	4,178	.....	2,422	.....	854	8,405
Portugal	.....	.....	.....	82	.....	2,149	.....	.....	.....	....	2,231
Spain	.....	.....	.....	.....	.....	.....	.....	80*	.....	....	80*
Sweden	.....	.....	.....	486	.....	1,964	.....	1,275*	.....	300	4,025
United Kingdom	471	.....	.....	.....	1,145	9,602	7,068	13,685	.....	1,591	33,562
Total Europe	3,336	951	.....	568	1,145	30,928	17,315	63,313	.....	5,298	122,854
Bahrein Island	.....	.....	.....	.....	.....	.....	.....	44,100*	.....	....	44,100*
British Malaya	.....	.....	.....	.....	.....	.....	.....	275*	68	....	343
China	.....	.....	.....	.....	.....	.....	.....	1,623*	.....	....	1,623
Indonesia	.....	.....	.....	.....	.....	.....	.....	.....	6,210†	118	6,328
Palestine	.....	.....	.....	.....	.....	.....	.....	7,318*	.....	....	7,318*
Total Asia	.....	.....	.....	.....	.....	.....	.....	53,316	6,278	118	59,712
Canary Islands	.....	.....	.....	.....	.....	1,460	.....	2,750*	.....	407	4,617
Egypt	.....	.....	.....	.....	.....	.....	.....	2*	.....	....	2*
Total Africa	.....	.....	.....	.....	.....	1,460	.....	2,752	.....	407	4,619
Australia	.....	.....	.....	.....	.....	253	689	.....	1,694	....	2,636
Total Oceania	.....	.....	.....	.....	.....	253	689	.....	1,694	....	2,636
Shipments in transit, misc. destinations, and adjustments	462	2,349	—268	389	—95	—13,937	—3,446	21,652	1,106	....	8,212
Total Exports	39,737	7,114	2,089	18,832	2,682	437,700	19,800	166,456	9,078	5,973	709,461

* Estimated.

† Shipments from British Borneo to Indonesia.

Note: The foregoing figures, while admittedly based on incomplete data, are believed to represent the major movements of crude petroleum in international trade in 1948.

WORLD REFINERY RUNS

Approach 9 Million Barrels Daily Average in Mid-1949

WORLD refinery runs to stills averaged 8,928,267 barrels daily at mid-1949, according to figures based on the U. S. Bureau of Mines monthly report, "World Petroleum Statistics," covering June, 1949.

Of this total the Western Hemisphere, with a daily average production for the period of 6,673,533 barrels, had runs to stills totaling 6,629,667, and the Eastern Hemisphere, with production of 2,381,500 barrels, had runs to stills of 2,298,600.

World Supply and Demand, Crude Petroleum, by Countries, at Mid-Year, 1949

(Based on U. S. Bureau of Mines Monthly Report, "World Petroleum Statistics," covering June, 1949.)

Summary of Daily Average

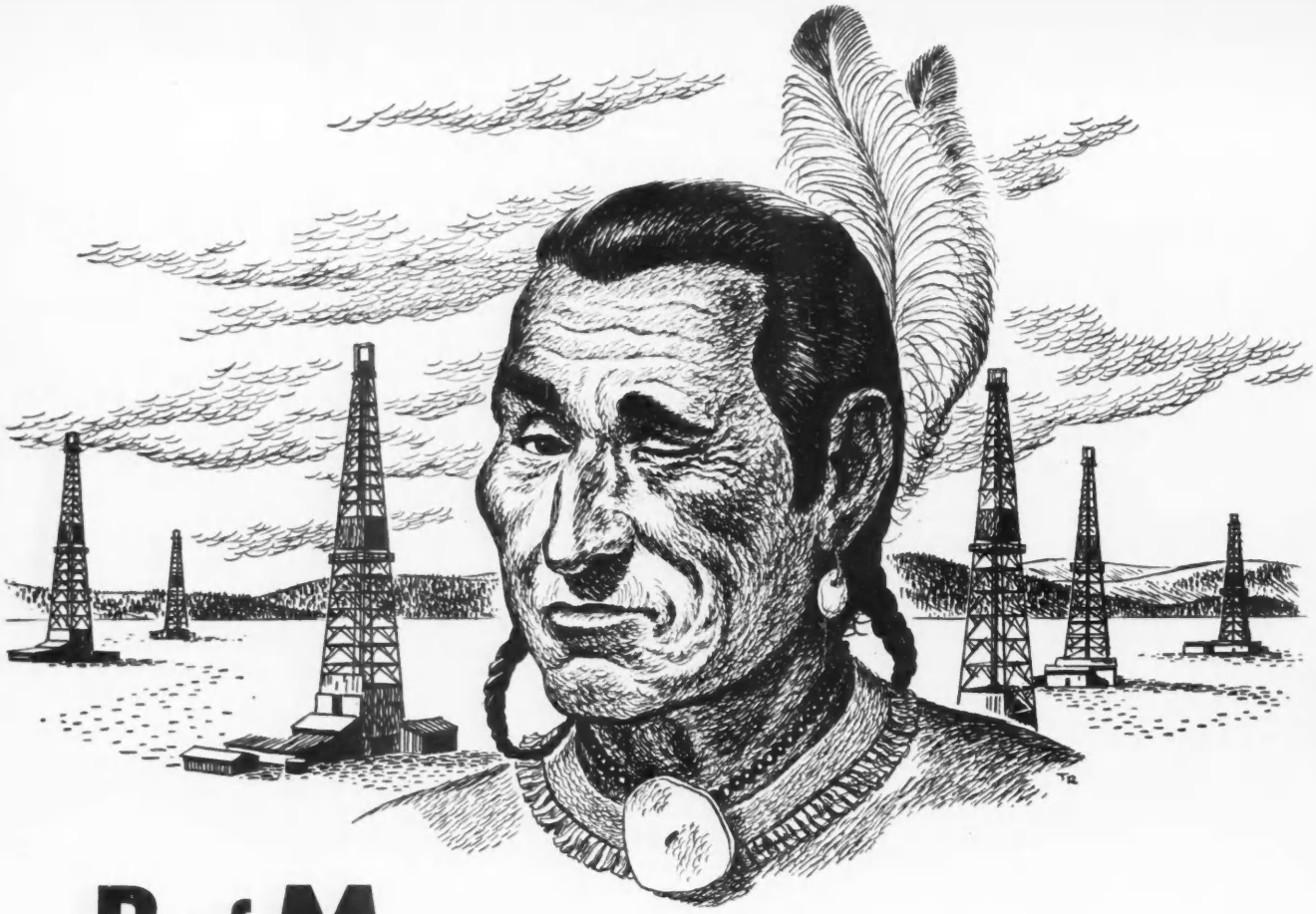
Crude Petroleum Production and Refinery Runs by Major Regions at Mid-Year 1949

(Based on U. S. Bureau of Mines Monthly Report, "World Petroleum Statistics," covering June, 1949.)

	Actual Barrels Daily	Percent of World
PRODUCTION		
United States	4,903,266	54.1
Other North America	223,700	2.5
Total North America	5,126,966	56.6
South America and Caribbean	1,546,567	17.1
Total Western Hemisphere	6,673,533	73.7
Middle East	1,414,600	15.6
Other Eastern Hemisphere	966,900	10.7
Total Eastern Hemisphere	2,381,500	26.3
Total Outside U. S.	4,151,767	45.9
WORLD TOTAL, Production	9,055,033	100.0
RUNS TO STILLS		
United States	5,162,033	57.8
Other North America	409,267	4.6
Total North America	5,571,300	62.4
South America and Caribbean	1,058,367	11.9
Total Western Hemisphere	6,629,667	74.3
Middle East	867,367	9.7
Other Eastern Hemisphere	1,431,233	16.0
Total Eastern Hemisphere	2,298,600	25.7
Total Outside U. S.	3,766,234	42.2
WORLD TOTAL, Runs to Stills	8,928,267	100.0

ACTUAL BARRELS DAILY

COUNTRY	Production	Imports	Exports	Crude Runs to Stills	Other Demand & Losses	Stock Change
NORTH AMERICA:						
Canada	56,733	219,667	.....	277,400	500	—1,500
Cuba	267	7,500	.....	5,200	.....	2,566
Mexico	166,700	100	17,766	126,667	7,367	15,000
Total N. America, excl. U.S.	223,700	227,267	17,766	409,267	7,867	16,066
United States	4,903,266	400,000	102,367	5,162,033	12,900	25,967
Total North America	5,126,966	627,267	120,133	5,571,300	20,767	42,033
SOUTH AMERICA & CARIBBEAN						
Argentina	62,667	33,334	.....	94,500	1,500	.....
Bolivia	1,833	.....	233	1,866	.....	—267
Brazil	100	.....	.....	500	100	—500
Chile	.....	.....	.....	.....	.....	.....
Colombia	83,400	.....	65,300	26,000	967	—8,867
Ecuador	7,333	.....	3,933	4,167	66	—833
Netherlands West Indies	.....	723,534	23,334	700,200	.....	.....
Peru	41,467	.....	8,933	33,467	167	—1,100
Trinidad	53,700	36,667	15,433	74,000	933	.....
Uruguay	.....	15,733	.....	14,900	.....	833
Venezuela	1,296,067	.....	1,118,734	108,767	32,500	36,067
Total S. America-Caribbean	1,546,567	809,268	1,235,900	1,058,367	36,233	25,333
Total Western Hemisphere	6,673,533	1,436,533	1,356,033	6,629,667	57,000	67,366
WESTERN EUROPE						
Belgium	.....	11,667	.....	7,733	.....	3,933
Denmark	.....	1,033	.....	767	.....	267
France	1,100	244,500	467	228,033	433	16,667
Western Germany	16,267	21,200	.....	40,000	333	—2,867
Italy and Trieste	200	61,667	.....	59,067	.....	2,800
Netherlands	11,767	78,367	.....	50,000	133	40,000
Portugal	.....	7,900	.....	6,000	.....	1,900
Sweden	.....	6,133	.....	6,133	.....	.....
United Kingdom	966	111,700	.....	106,667	834	5,167
Total Western Europe	30,300	544,167	467	504,400	1,733	67,867
MIDDLE EAST						
Bahrein Island	29,933	129,333	.....	164,967	167	—5,867
Egypt	43,600	.....	.....	46,067	167	—2,633
Iran and Kuwait	783,434	.....	295,000	495,333	11,000	—17,900
Iraq	76,500	.....	64,333	8,000	4,167	.....
Lebanon	.....	4,067	.....	4,067	.....	.....
Saudi Arabia	481,133	.....	327,767	148,933	366	4,067
Turkey	.....	.....	.....	.....	.....	.....
Total Middle East	1,414,600	133,400	687,100	867,367	15,867	—22,333
OTHER ASIA						
China	1,400	.....	.....	2,333	67	—1,000
India, Burma and Pakistan	7,900	.....	.....	7,834	67	.....
Japan	3,800	.....	.....	3,633	166	.....
Total Other Asia	13,100	.....	.....	13,800	300	—1,000
OTHER AFRICA						
Canary Islands	.....	13,333	.....	12,000	.....	1,333
French Morocco	267	.....	.....	200	67	.....
Total Other Africa	267	13,333	.....	12,200	67	1,333
OCEANIA						
Australia	.....	14,667	.....	12,000	.....	2,667
British Borneo	68,533	.....	.....	.....	.....	.....
Indonesia	124,700	.....	14,067	176,833	2,333	.....
Total Oceania	193,233	14,667	14,067	188,833	2,333	2,667
Total Above Countries	8,325,033	2,142,100	2,057,667	8,216,267	77,300	115,900
U. S. S. R. and EASTERN EUROPE						
U. S. S. R.	620,000	.....	.....	605,000	15,000	.....
Other Eastern Europe	110,000	3,000	3,000	107,000	3,000	.....
Total U. S. S. R. and E. Europe	730,000	3,000	3,000	712,000	18,000	.....
Total Eastern Hemisphere	2,381,500	708,567	704,634	2,298,600	38,300	48,534
Total Outside United States	4,151,767	1,745,100	1,958,300	3,766,234	82,400	89,933
WORLD TOTAL	9,055,033	2,145,100	2,060,667	8,928,267	95,300	115,900



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WORLD DEVELOPMENT

Enters New Phase

BEGINNING of 1950 found the petroleum industry facing a vastly different set of conditions than those in sight at the beginning of 1949. At that time the world had looked back upon several years during which every effort was made to deveolp sufficient production and to build enough refining capacity to meet world demands growing beyond the most ambitious estimates, and was looking forward to a continuation of this effort. New records were being set in all phases of the industry, and it seemed as if the industry was faced with another year of the same kind of pressure.

Almost overnight the world found itself with enough crude to satisfy demand. Crude and products were moving out of the Persian Gulf area in quantities previously thought out of the question without pipe lines to the Mediterranean, and were being delivered to markets throughout the world. An unusually mild winter on the U. S. Atlantic seaboard allowed stocks to mount, and it was possible to cut back to some extent on production from seriously taxed American fields.

Despite removal of the greater part of the pressure, the petroleum industry was not idle in 1949. There still remains the outlook for a continuation of the upward trend in world demand, and the world-wide industry continues its program of preparation, but with supply ample these burdens can be met with apparent ease.

In addition to the normal desire of oil companies to expand their operations and improve their relative position in the industry, there has been a strong desire on the part of nations outside the U. S. to expand their facilities in order to become as near self-sufficient as possible and at the same time conserve critical supplies of dollars and other foreign exchange. This included, not only the desire and effort to establish greater producing potential, but to establish their own refining, storage and distribution systems. Through the European Recovery Plan many countries never self-sufficient as to oil production have instituted ambitious programs of refinery construction. Through the efforts to help European countries save dollars wherever possible, much of the supply for existing plants, and the future supply for plants under construction, has been coming and will be coming from sources outside the so-called "dollar" areas. There has been a strong shifting of lines of supply in line with the forecasts of the past several years, and much crude and refined products for Europe are being drawn from the Middle East fields.

At the same time, the European countries themselves are making additional efforts to establish indigenous sources of crude supply. Some have been hampered by internal conditions which have delayed full-scale exploratory efforts; others are well advanced in their activity. As a whole, the world has seen a substantial expansion of activity during 1949, and some return may be expected.

An outstanding example of postwar activity has been Western Canada, where

the opening of the Leduc field in February, 1947, touched off a program of exploration and development which has gained impetus through two full years and is believed to be only now getting into full swing. By the end of 1947, Leduc's reserve was estimated at 50 million barrels; and continued development has resulted in proved reserve now estimated in excess of 250 million barrels. A new field producing from the same prolific Devonian Reef formations was brought in late in 1948 at Redwater, and has proved reserves now estimated in excess of 650 million barrels. The wildcat campaign intensified by the Redwater find has resulted in a number of lesser fields, and expansion of older fields, until at the beginning of 1950, an estimate of more than 1.5 billion barrels of reserves for the province of Alberta alone was believed conservative.

During 1949 the geophysical and leasing program rapidly spread past the boundaries of Alberta, and into other Western Canadian provinces of Saskatchewan, British Columbia and Manitoba. All these provinces have seen wildcat drilling during 1949 and evidences of the accumulation and possible production of oil have been found in each. There are now more than 125 million acres of private and government oil rights held in the active provinces, compared with little more than 20 million acres a scant two years ago.

Production has been established to more than take care of the needs of the prairie provinces themselves at about 62,000 barrels a day, more than triple the output of 1947 and double the 1948 production. The actual production figures are not an index to the producing potential achieved, since the lack of a transportation outlet to outside markets has forced drastic curtailment of output through pipe line proration measures on the part of purchasers. More or less as a byproduct of the search for oil, tremendous new reserves of natural gas have been found, opening up plans for great transmission lines to carry gas to Central and Western Canada and Northwestern U. S. Thus far the authorities have not approved any of the several gas pipe lines proposed, but it is probably only a matter of a short time before construction will begin.

It is estimated that the industry spent more than $100 million in Western Canada during 1949, just about double the investment during 1948, and current planning indicates perhaps as much as $300 million will be spent in 1950, of which roughly one-third is earmarked for a new pipe line outlet from the Edmonton area to a shipping terminal on Lake Superior. This expansion will include every phase of the industry such as refining, gasoline extraction, drilling, production and transportation.

During 1949 Alberta alone accounted for the drilling of 820 new wells, compared with 356 wells drilled in 1948 in the same area. At the close of 1949 more than 100 geophysical crews were in operation, the number having grown from no more than 15 crews at the time Leduc was discovered.

Another Western Hemisphere region to show sharp upswings in all-round development has been Mexico, where under stress of necessity of developing production to provide an exportable surplus, the drilling program has been stepped up sharply. Additional drilling equipment is in operation, and Petroleos Mexicanos has drilled more wells than have been drilled in any year since expropriation. Encouraging results have been obtained, particularly in Northeastern Mexico, where the Reynosa field has developed into a potentially important reserve of both oil and gas. In addition, new fields have been found in other regions which have not yet been developed to the point where their importance can be estimated.

Recent geological work has been credited with the establishment of new areas for fill-in drilling along the Golden Lane, with the Alazan field as an example where Pemex representatives believe an

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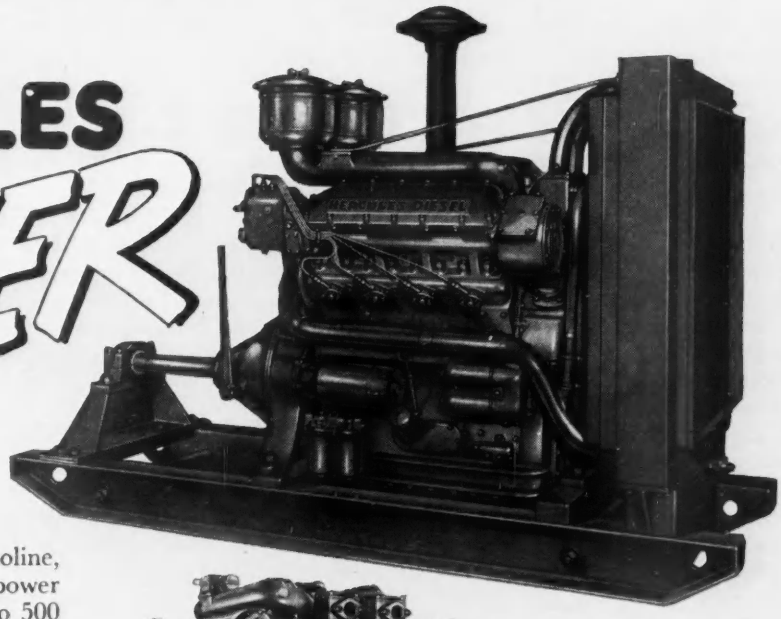

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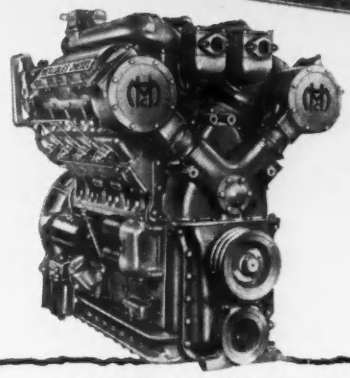

(Left) Front view of the base type model DNX-V8 Vee eight cylinder Hercules diesel engine used in the latest edition to the Hercules diesel line shown above. This power unit is available in four models offering piston displacements from 1247 to 1468 cu. ins. It is designed to introduce new economies to drilling operations.

HERCULES ENGINES

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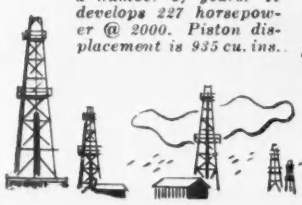
The model HXE gasoline or natural gas power unit shown at the right is one of four models in this series which have been popular in the oil field for a number of years. It develops 227 horsepower @ 2000. Piston displacement is 935 cu. ins.



HERCULES ENGINES 3 TO 500 H. P.

GAS AND GASOLINE ENGINES

Model	Bore and Stroke	Cu. In. Displ.
Two Cylinder		
BXB	2⅞" x 3"	39
NXA	3" x 4"	56.5
NXB	3¼" x 4"	66.3
Four Cylinder		
ZXA	2½" x 3"	59
ZXB	2⅝" x 3"	65
IXA	3" x 4"	113
IXB	3¼" x 4"	133
JX4E	3½" x 4¼"	164
JX4C	3¾" x 4¼"	188
JX4D	4" x 4¼"	214
Six Cylinder		
QXA	3⅛" x 4⅛"	190
QXB	3¼" x 4⅛"	205
QXC	3⅜" x 4⅛"	221
QXLD	3 7/16" x 4¼"	236.7
JXE	3½" x 4¼"	245
JXB	3⅝" x 4¼"	263
JXC	3¾" x 4¼"	282
JXD	4" x 4¼"	320
JXLD	4" x 4½"	339
WXC-3	4¼" x 4½"	383
WXLC	4" x 4¾"	358
WXLC-3	4¼" x 4¾"	404
TDXB	4⅜" x 5¼"	474
RXB	4½" x 5¼"	501
RXC	4⅝" x 5¼"	529
RXLC	4⅝" x 5¼"	529
RXLD	4¾" x 5¼"	558
RXLDH	4¾" x 5¼"	558
HXB	5" x 6"	707
HXC	5¼" x 6"	779
HXD	5½" x 6"	855
HXE	5¾" x 6"	935
*HXE	5¾" x 6"	935

DIESEL ENGINES

Model	Bore and Stroke Inches	Piston Displ. Cu. In.
Two Cylinder		
DIXC	4" x 4½"	113.1
DIXD	4¼" x 4½"	127.5
Four Cylinder		
DIX4B	3¼" x 4"	133
DIX4D	3⅝" x 4"	166
DOOB	3¾" x 4½"	198.8
DOOC	4" x 4½"	226.2
DOOD	4¼" x 4½"	255
Six Cylinder		
DIX6D	3⅝" x 4"	249
DJXB	3½" x 4½"	260
DJXC	3¾" x 4½"	298
DJXH	3¾" x 4½"	298
DJXHF	3¾" x 4½"	298
DWXC	4" x 4¾"	358
DWXD	4¼" x 4¾"	404
DWXLD	4¼" x 5"	426
DWXLDF	4¼" x 5"	426
DRXB	4⅜" x 5¼"	474
DRXC	4⅝" x 5¼"	529
DFXB	5" x 6"	707
DFXC	5¼" x 6"	779
DFXD	5½" x 6"	855
DFXE	5⅝" x 6"	895
DFXH	5¾" x 6"	935
DFXHF	5¾" x 6"	935
Eight Cylinder		
DNX V-8B	5¾" x 6"	1247
DNX V-8C	6" x 6"	1348
DNX V-8D	6¼" x 6"	1468
DNX V-8DS	6¼" x 6"	1468

*Dual Carburetion

additional 10,000 barrels daily production will result.

In the Isthmus of Tehuantepec a new gas-distillate reserve has been established at Fortuna Nacional, in Tabasco.

One of the important 1949 developments in Mexico was consummation of a contract with American Independent Oil Company, Edwin W. Pauley and Signal Oil Company under which the American companies, operating as Mexican American Independent Company, are drilling a series of wildcat tests in the region of the Isthmus of Tehuantepec, including both land and offshore drilling. Starting the first well in the middle of the year, the company had already established production in one offshore prospect near Coatzacoalcos before the end of the year. Another well drilling near Ciudad Carmen was being watched with interest.

Other activity in Mexico included continued progress on refinery and pipe line construction. Much of the planned pipe line mileage was designed to carry natural gas to Mexico City and Monterrey to supplant crude oil products as fuel for industry.

Venezuela, for several years the most active country outside the U. S., relinquished its position on drilling volume to Canada, but still stands out as a crude producer. The lessened requirements for the heavy crude used in manufacture of fuel oil caused sharp cutbacks in Venezuela's production during the early part of the year, and field operations were substantially curtailed. As a result, there was a decline of about 30 percent in drilling below the record 889 wells drilled in 1948. Most of the cuts in drilling volume were in proved areas, particularly in the heavy oil areas in the region of Lake Maracaibo, while wildcatting continued active in both Western and Eastern Venezuela, with uncertain success other than discovery of two producing areas in the eastern part of the country.

Shell Group's new 40,000-barrel refinery on Paraguana Peninsula started operations during 1949, using crude from the lake area, and from the newer Cretaceous producing fields west of the lake. Creole Petroleum Corporation's 60,000-barrel refinery, building since 1947, is scheduled for completion during 1950.

Two of South American countries, Colombia and Peru, are hopeful of stimulating development through institution of new petroleum laws.

Colombia Sets Record

Colombia established a record for production during the year, but development generally suffered through uncertainty on the part of oil operators as to what might be expected from the new petroleum law. An attempt was made recently to place the law in operation through presidential decree inasmuch as a state of siege still existed early in the year following the political troubles of last year. It was anticipated that the Congress would legalize the law, but the companies still seemed to be waiting for congressional action before making decisions as to future plans. A field was brought in by Texas Petroleum Company in the Tetuan area of the Upper Magdalena Valley, but it is unlikely to have rapid development unless the first few wells indicate possibility of establishing production in sufficient quantities to justify a pipe line outlet.

In Peru a new petroleum law was drafted by a special committee and presented to a congressional committee for consideration. Advance reports indicated it should pass with little opposition since it is the result of a cooperative effort to liberalize regulations so that acreage may be granted to foreign capital for exploration and development. For the past several years there had been a slackening of interest on the part of possible investors, since all the favorable area was held as part of the national reserve.

Developments in Southern Chile progressed to the stage where that country will probably enter the list of active producers during 1950. At latest report about 16 producing wells had been completed in the Cerro Manantiales field, and the pipe line to the new terminal at Caleta Clarencia was completed late in the year. Field storage was being filled, and some oil is now going into the tanks at the terminal on the Straits of Magellan.

Bolivia has already started use of its new pipe line system from Camiri field to Cochabamba and Sucre, and drilling activity was intensified to build up production for its supply.

In the Eastern Hemisphere, outside of countries within the Soviet sphere of influence, advances have been steady during 1949, with European countries upon which information is available showing activity beyond that achieved during 1948. Germany, the most active of the European nations, virtually doubled the 1948 drilling footage by accounting for nearly 1 million feet of hole in Western Germany alone. The accent was on exploration drilling, and a number of new areas were found. However, the chief value of the program was the expansion of previously producing fields through drilling of extensions and deep tests, and fields of the Emsland district are now accounting for the larger part of the 16,300-barrel-a-day production. Germany was also stepping up its program of refining through rehabilitation of units destroyed by bombing during the war, and acquired additional capacity through permits to use two of the larger hydrogenation plants for processing crude.

Actual drilling activity in the Netherlands fell off, since the Schoonebeek field has reached its optimum rate of flow at just under 12,000 barrels daily, but several wildcats were drilled during the year. One of these was reported to have found oil northeast of Schoonebeek and near the German border. There also was some exploration in the northern part of the country, results of which are not yet known.

There was some slackening of drilling

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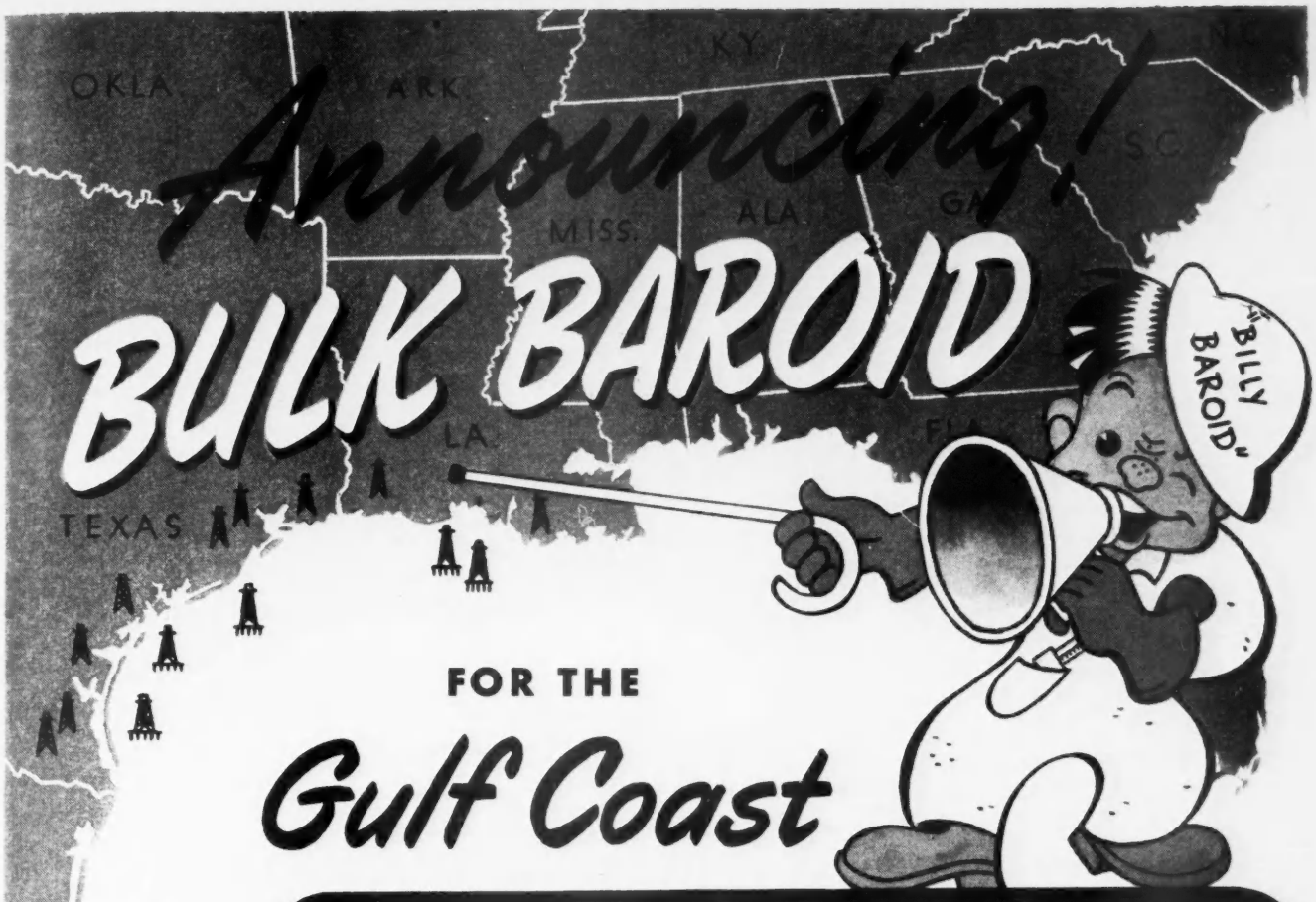

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activity in Italy since the early part of 1949, chiefly due to the happenings in official circles which indicated the entire responsibility of developing oil and gas resources might be placed in the hands of a government-owned company.

Foreign and domestic privately-financed concerns were more or less marking time until a clear definition of Italian policy was forthcoming. Events were picking up momentum early in the year with progress of the construction program to build gas lines to carry natural gas to the principal populated and industrial centers of Northern Italy from the substantial gas fields of the Po Valley. At least one discovery of a field producing a considerable amount of high-gravity oil along with gas was reported at Cortemaggiore in the Upper Po Valley, but the area saw comparatively little new development, and reports from private and official sources conflicted somewhat as to evaluation of the find. There was continued progress in refining expansion, supported by ECA funds and by foreign private capital.

One development of the past year in France which might prove of unusual local importance was the discovery of oil in Alsace from the Muschelkalk formation, hitherto unproductive in the region. It was associated with accumulation along a fault trend of major proportions and may lead to development of production of considerable economic importance to France, which produces a relatively insignificant share of its demand. Meanwhile, the gas pipe line outlet from the Saint Marcet gas fields in Southwestern France was progressing toward completion, and a number of cities were connected during the year to the completed portion of the system.

Qatar Active

Outstanding developments of the past year in the Middle East included a resumption of activity in Qatar, with construction of a pipe line and shipping terminal to carry oil from the Dukhan field, which was under development during the year, and which started shipping oil on the last day of the year.

An event of some importance was the entry of American Independent Oil Company and Pacific Western Oil Company into active participation in the exploration for oil on the Persian Gulf. This company owns concessions on the Saudi Arabia-Kuwait Neutral Zone, and following geological work started drilling its first of a four-well wildcat program. This particular operation is unique in that it is a land operation being drilled from a water-borne base. The location being drilled is about 20 miles inland from the shore of the Gulf, while living quarters, offices, warehouse and other auxiliary installations are situated aboard a converted LST anchored offshore. Drilling equipment and supplies were transported to the scene in the same ship.

Other Middle East countries around the Persian Gulf continued normal drilling activity, with producing potential already higher than current requirements which saw the area as a whole produce more than ½ billion barrels of oil during 1949. The most active was Kuwait, where about 12 rigs were kept busy, and Saudi Arabia. Kuwait Oil Company is drilling a deep test in the Burghan field which may establish whether or not the Arab limestone will be productive underneath the currently producing Cretaceous sand. Other developments in Kuwait include construction still in progress on the huge pier for berthing tankers and freighters.

In Saudi Arabia the exploration program resulted in indication of production in two new fields at Haradth, nearly 100 miles south of Abqaiq, and at Fathili, between Abqaiq and Abu Hadriya. The trend of the Ain Dar field, discovered in 1948, has been confirmed by additional wildcats several miles apart in a northeast-southwest trend, but the area is far from defined. A considerable amount of work was done on the Tapline, with about 314 miles completed before the end of the year, and work preparing to start from the Mediterranean end.

An important pipe line from Kirkuk field was completed as Iraq Petroleum Company placed the northern leg of its dual 16-inch system in operation. This made it possible to step up production to approximately 100,000 barrels a day. The southern leg, which terminates at Haifa, is still inoperative due to political difficulties. Operation of all lines would give Iraq an outlet for about 270,000 barrels daily.

Some attention was drawn to Pakistan late in 1949 with announcement that Attock Oil Company had completed a well near Lakhra in Sind, capable of producing 1600 barrels daily, but no additional wells have been completed to furnish a better evaluation of the new find. Of some interest was the publication of new petroleum regulations by the Government of Pakistan designed to attract additional operators.

During the past year the East Indies were able to consolidate rehabilitation in the form of increased producing and refining potential with the result that total output was restored to very near prewar levels. There has been some shifting of production centers from those of ten years ago, since British Borneo is now producing more than three times the amount it produced in 1939, while the remainder of Indonesia is somewhat less, since many areas have remained inaccessible, including almost all of Java. Activity has been concentrated in Borneo and in the fields of Southern Sumatra.

Drilling on a restricted basis went forward in the Klamono field of Netherlands New Guinea. Australasian Petroleum Company has stepped up activity in Papua, but without success.

Rates from Middle East, Venezuela

The following table and notes are taken from an address on "Oil in Venezuela," delivered in Caracas last summer by Joseph E. Pogue, then vice president of the Chase National Bank, and now an official of the Gulf Oil Corporation. Shown are relative transportation costs of moving oil from Venezuela and the Middle East to important markets.

Relative Transportation Costs from Venezuela and Middle East Shipping Points to Various Destinations

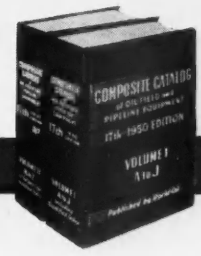
(in dollars per barrel)

	SHIPPING POINT					
	Puerto La Cruz Venezuela		Bahrein or Ras Tanura, Persian Gulf		Haifa, Palestine	
Destination	By T-2 Tanker	By 26,000 DWT Tanker	By T-2 Tanker	By 26,000 DWT Tanker	By T-2 Tanker	By 26,000 DWT Tanker
Southampton	0.55	0.50	1.08	1.04	0.44	0.42
New York	0.25	0.23	1.28	1.23	0.67	0.63
Montreal	0.37	0.35	1.30	1.25	0.68	0.64
Buenos Aires	0.64	0.59	1.24	1.14	1.07	0.98
Rio de Janeiro	0.50	0.46	1.16	1.07	0.90	0.83

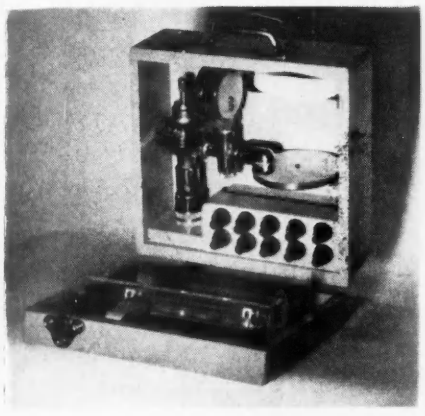
Figures represent shipping costs from deep water ports, not from the oil fields, and include depreciation plus 5 percent return on original investment. Pipe line cost plus 5 percent return will vary considerable depending upon the location of crude oil in relation to the shipping point. For example, Iraq crude moved to Haifa costs approximately 48 cents per barrel, including 5 percent return on investment. This figure covers cost of gathering, handling, storing, and loading, as well as the pipe line movement. Probable cost for moving Officina crude to Puerto La Cruz is about 13 cents per barrel, and for moving crude from Lake Maracaibo fields by tanker to deep water ports about 25 cents per barrel.

NEW AND IMPROVED EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG



60—Filter Test Unit



This item supplements Magnet Cove Barium Corporation data as shown on pages 3049-3060 of Composite Catalog, 17th Edition.

The Fann Midget cylinder pressure unit eliminates the use of air or nitrogen bottles on mud filter presses, according to the manufacturer. Pressure for the filtration test is supplied by thumb-size carbon dioxide cylinders.

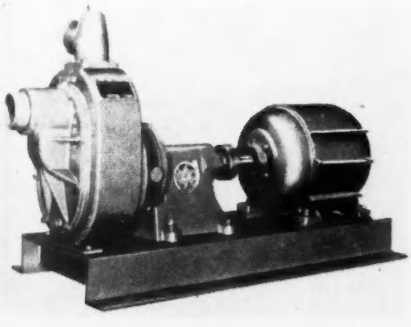
The unit is fitted in a carrying case which has accommodations for ten carbon dioxide cartridges, enough for more than 30 filtration tests.

For additional information, write Magnet Cove Barium Corporation, 5001 Richmond Road, Houston, *referring to* WORLD OIL *item* 60.

61—Centrifugal Pump

This item supplements Marlow Pumps data as shown on page 3081 of Composite Catalog, 17th Edition.

A line of straight centrifugal pumps has been added to the Marlow line to expand it to 56 basic series. The new centrifugals Types SC and SL, are for use primarily on installations with flooded suctions and are available in close or long-coupled construction, one to four-inch sizes, and with capacities from 10 to 1000 gallons per minute.



Consisting of casing, impeller with shaft sleeve and the driving motor, the unit may be installed and operated in either vertical or horizontal position. It has renewable sealing ring at the suction inlet and deep-groove oversize ball bearings sealed against dirt and moisture. The stuffing box, an integral part of the casing, contains a liberal number of packing rings. Where desired, a John Crane mechanical-type self lubricating dripless shaft is available.

Motors, which range from ½ to 30 horsepower, are splash protected and equipped with moisture resistant insulation. Explosion proof or fully enclosed motors are also available.

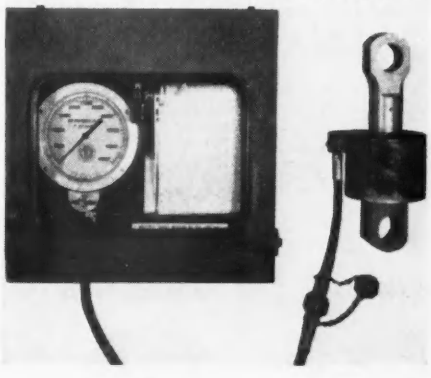
For additional information, write Marlow Pumps, 568 Greenwood Avenue, Ridgewood, N. J., *referring to* WORLD OIL *item* 61.

62—Dynamometer

This item supplements Martin-Decker Corporation data as shown on pages 3089-3128 of Composite Catalog, 17th Edition.

A new draw bar dynamometer measures pull or torque in traction tests of various vehicles, determines horsepower, or strength of structures. The instrument consists of a combination indicator, recorder, and measuring element. The indicator gauge has a range to 50,000 pounds draw bar pull. The recorder is available in any chart speed from two inches per hour to six inches per minute.

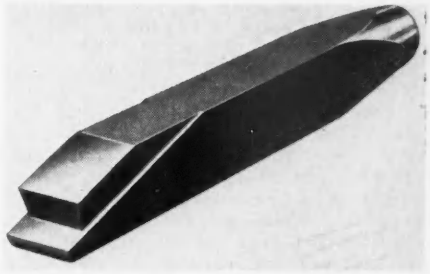
MARTIN-DECKER DRAW BAR DYNAMOMETER



The measuring element is a hydraulic device which may be disconnected at any time with a leakproof disconnect coupling. It is available with any suitable length of hose, so that recording and indicating gauges may be mounted at locations away from vibration.

For additional information, write Martin-Decker Corporation, Cherry Avenue and Wardlow, Long Beach 7, Calif., *referring to* WORLD OIL *item* 62.

63—Tong Die Driver



This item supplements Web Wilson Oil Tools, Inc., data as shown on pages 5057-5080 of Composite Catalog, 17th Edition.

Removal of a wornout tong die from the tong die slot is simplified with the use of the "Jiffy" tong die driver. In addition to driving out the old tong die, the driver reconditions the tong die slot. The tool has an overhanging guard that protects the user from flying chips.

For additional information, write Web Wilson Oil Tools, Inc., Huntington Park, Calif., *referring to* WORLD OIL *item* 63.

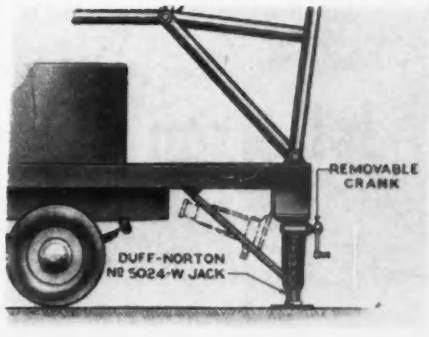
64—Screw Jack

This item supplements Duff-Norton Manufacturing Company data as shown on page 1385 of Composite Catalog, 17th Edition.

Truck-mounted oil field drilling rigs and masts can be supported by a new standard speed screw jack. The jacks, designated 5204-W, are used in pairs for this application.

Positioning or leveling of equipment is accomplished by means of a hand crank. The operating mechanism is completely enclosed and self-lubricated.

For additional information, write Duff-Norton Manufacturing Company, Preble Avenue, Pittsburgh, *referring to* WORLD OIL *item* 64.

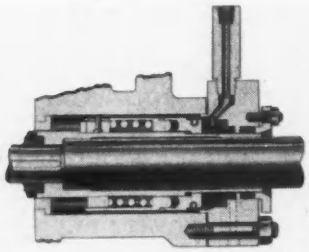


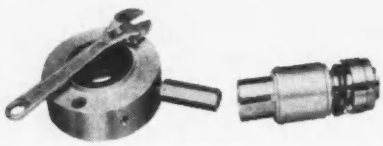
65—Mechanical Seals

This item supplements Byron Jackson Company data as shown on pages 901-1000 of Composite Catalog, 17th Edition.

Three types of mechanical seals for centrifugal pump stuffing boxes can replace conventional packing in refining, process, and chemical industry pumps, and in pipe line installations and other general purpose process pumps. When made of corrosion and heat-resistant materials, they are suitable for corrosive service at high temperatures and pressures.

The seals require no adjustment during or after installation. The Type U, illustrated, is a high-pressure single seal, available for shafts from 1⅛ to 5⅞ inches, and can be adapted to shafts of larger diameter. The carbon stationary face is locked in position and protected from damage during installation and handling by a seal cover. A seat gasket prevents leakage around the stationary face, and a "U" cup prevents leakage under the rotating face, which is usually





constructed of chrome steel. Both act as flexible members.

Type L is a low-pressure single seal designed for small pumps handling cold water or products where temperatures do not exceed 110° F. and pressures do not exceed 50 pounds per square inch. It is suitable for pump shafts not more than two inches in diameter.

Type B is an oil lubricated double seal for high pressures and cold service where pumped liquids contain little lubricating value. Included with the Type B is a two-compartment oil tank assembly. From a supply of oil stored in the tank, lubrication leakage from the seals is replaced during operation.

For additional information, write Byron Jackson Company, Pump division, Terminal Annex Box 2017, Los Angeles 54, *referring to* WORLD OIL *item* 65.

66—Dial Indicator

This item supplements Taylor Instrument Companies data as shown on page 4650 of Composite Catalog, 17th Edition.

A concentric or full-circle dial indicator has been designed for transmitting, receiving and controlling instruments.

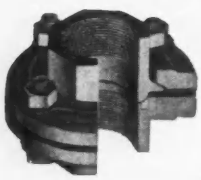
The indicator has a dial construction which makes instrument mechanism accessible for inspection or adjustment by

rotation of the dial. The dial has a large pointer with 270-degree sweep, and white numerals on a black background.

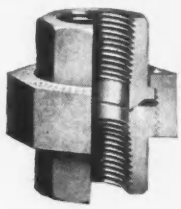
The instrument can be used only with low pressure unit or mercury manometer actuation for differential or absolute pressure applications. It is available as a simple indicator, indicating receiver, indicating controller, indicating transmitter, indicating transmitter controller, or indicating receiver controller. Standard ranges are 0 to 10 on square root scale and 0 to 100 and 0 to 200 on uniform scales.

For additional information, write Taylor Instrument Companies, 95 Ames Street, Rochester 1, N. Y., *referring to* WORLD OIL *item* 66.

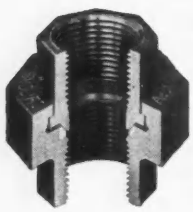
Jefferson Malleable Unions



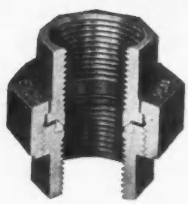
STYLE "B"—3-Part Ground Joint pipe line flange union greatly facilitates the laying of pipe and especially where pipe is out of alignment. Certified Air Furnace iron. Sizes ½" thru 10".



STYLE "A"—Ground Joint union and union fittings. Complete line straight and reducing. Sizes ⅛" thru 2½"—3000 lb. test; 3" and 4"—2000 lb. test. Made of Certified Air Furnace iron.



ENDURO—300 lb. S.W.P.—600 lb. C.W.P. unions. Sizes ⅛" thru 3".



EXCEL—250 lb. S.W.P.—500 lb. C.W.P. unions. Also a complete line of unions, ells and union tees with union on the run. Made of Certified Air Furnace iron. Sizes ¼" thru 3".

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NEW EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

67—Crane Block

This item supplements American Hoist and Derrick Company data as shown on page 228 of Composite Catalog.

All types of hook work can be handled with the new Lo-Head crane block, in capacities from 10 to 50 tons. The new block permits 1½ to 2-foot higher lifts without lengthening the boom, because of its shorter over-all length.

The forged hook operates on Timkin tapered roller bearings and the cast steel sheaves are equipped with Hyatt Hi-Load bearings. Lubrication is necessary only once in 2000 hours. Alemite fittings are provided for standard grease gun use.

For additional information, write American Hoist and Derrick Company, Robert and Water streets, St. Paul 1, Minn., *referring to* WORLD OIL *item* 67.

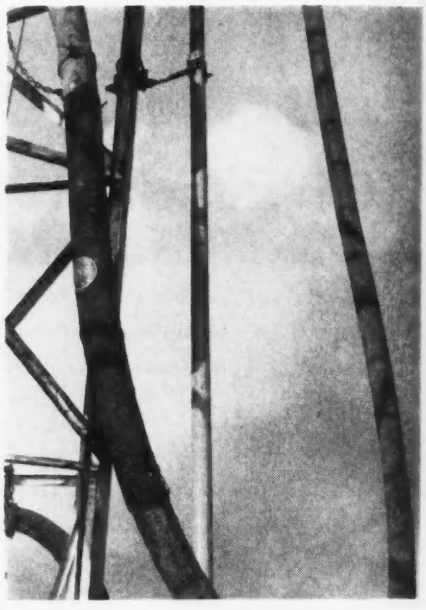
68—Hose Protector

This item supplements Goodall Rubber Company, Inc., data as shown on pages 1842-1843 of Composite Catalog, 17th Edition.

A rubber protector designed to be laced onto rotary hose at the point where the hose bumps or rubs against girths and tong lines is made of reinforced two-ply automobile tread stock rubber.

"Rubber-Hide" protectors are available in lengths of six feet to fit 2½- and 3-inch hose. The material is also available in rolls of 60 feet, for cutting into any desired lengths at the rig. It is furnished with sufficient lacings for the entire length of the protector.

For additional information, write Goodall Rubber Company, 1606 Maury Street, Houston, *referring to* WORLD OIL *item* 68.



WHITNEY NATIONAL BANK
OF NEW ORLEANS

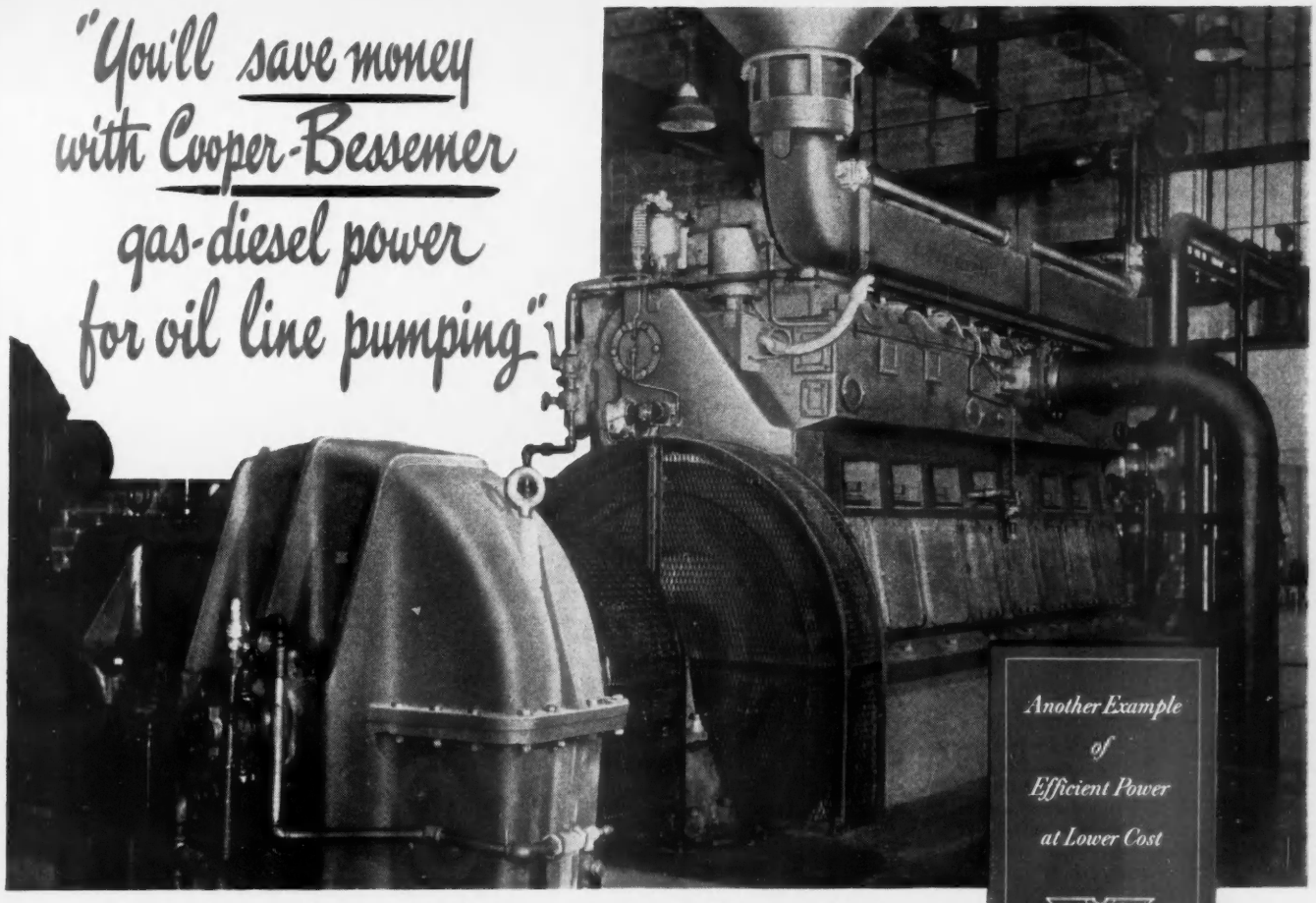
ESTABLISHED 1883

CONDENSED STATEMENT OF CONDITION
DECEMBER 31, 1949

ASSETS		LIABILITIES		
Cash and Due from Banks	$ 82,574,731.56	Deposits		$331,072,238.00
U. S. Government Obligations	166,764,998.50	Acceptances		2,103,202.24
State, Municipal and Other Public Bonds	13,831,670.39	Dividend Payable Jan. 3, 1950		112,000.00
Other Bonds and Securities	403,174.27	Reserve for Taxes and Accrued Interest and Expenses		1,269,979.20
Loans and Discounts	83,299,419.64	Other Liabilities		45,566.53
Bank Premises	2,850,208.14	Capital Stock	$2,800,000.00	
Other Real Estate	213,910.07	Surplus	9,200,000.00	
Customers' Liability Account of Acceptances	1,188,326.90	Undivided Profits	5,885,529.65	
Accrued Income Receivable and Other Assets	1,362,076.15			17,885,529.65
TOTAL	$352,488,515.62	TOTAL		$352,488,515.62

DEPOSITARY OF THE UNITED STATES GOVERNMENT, STATE OF LOUISIANA AND CITY OF NEW ORLEANS
MEMBER OF THE FEDERAL DEPOSIT INSURANCE CORPORATION

"You'll save money with Cooper-Bessemer gas-diesel power for oil line pumping"

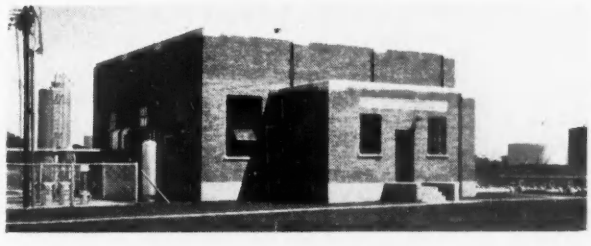


One of the two 690 hp Cooper-Bessemer gas-diesels driving centrifugal pumps in Empire Pipe Line Company's Sour Lake, Texas, station. Typical Cooper-Bessemers, these engines are giving exceptionally economical, trouble-free service.

HERE'S 4-WAY PROOF OF NEW ECONOMY AND HIGH EFFICIENCY

Cooper-Bessemer gas-diesels are a money-saving "natural" for oil line pumping service. This is evidenced by the performance of two of these modern units in Empire Pipe Line Company's Sour Lake station (shown here). Originally installed as oil-burning diesels during 1946-47, the engines operated with exceptional efficiency and economy, but were later converted to gas-diesel operation.

A view of Empire Pipe Line Company's modern pumping station at Sour Lake, Texas, powered by the two Cooper-Bessemer 690 hp gas-diesels.



DIRECT SAVINGS AND ADVANTAGES

1. Here, as elsewhere, the use of low-cost gas, at full diesel efficiency, has cut fuel cost to a mere fraction of the cost of oil-burning operation. Cooper-Bessemer gas-diesels operate on any gas-oil combination from 5 to 100% oil as influenced by fixed or variable fuel supply.

2. Lube oil consumption is incomparably low. The oil-burning diesels operated a normal 2,340 hp hrs per gallon of lube oil consumed. Gas-diesel operation now actually averages 9,350 hp hrs per gallon. This big saving is also typical.

3. Likewise, the lube oil filters lasted over 3 times as long, indicating less than one-third the lube oil contamination under gas-diesel operation.

4. Overhauls after 11,000 operating hours showed only .003" liner wear at the top. There was no measurable wear at the middle of the liners. The rings showed so little wear they were reinstalled.

Why not add up the savings and advantages you stand to gain with reliable, highly efficient Cooper-Bessemer gas-diesels on the job?

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Seattle, Wash. Tulsa, Okla. Shreveport, La. St. Louis, Mo. Los Angeles, Calif.
Caracas, Venezuela Gloucester, Mass. Calmes Engineering Co., New Orleans, La.

NEW EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

69—Heavy-Duty Trucks

This item supplements International Harvester Company data as shown on pages 2537-2540 of Composite Catalog, 17th Edition.

Four classifications of four-wheel trucks are included in the new L-line. They are the Standard, ranging from 4200 to 40,000 pounds, gross vehicle weight; the Schoolmaster, five bus models from 12,500 to 24,000 pounds; the Loadstar, from 16,500 to 29,500 pounds; and the Roadliner, from 16,000 to 30,000 pounds.

Cabs of the new trucks have been enlarged to 58¼ inches wide by 51-5/16 inches high by 58-3/16 inches long inside. Knee room has been increased by a reduction in the steering column angle accomplished by having the column enter the cab in a more horizontal position. Full width seats are built as a unit, so that the proper angle between back and seat is maintained at any position of seat adjustment. A one-piece curved

windshield gives unobstructed front vision.

Wheelbases have been shortened as much as seven inches in some models in order to shift load weight so that it is in balance between front and rear axles. Shorter wheelbase also results in shorter turning radius. Turning angle on most models has been increased to a minimum of 37 degrees.

The new Silver Diamond engine, used in light and medium-duty trucks, is a valve-in-head, six-cylinder model, and is built in two sizes: the 220 cubic inch displacement size at 100 horsepower and 240 cubic inch displacement at 108 horsepower. Each has a compression ratio of 6.5 to 1. For heavier trucks, the Super Blue Diamond engine has a displacement of 269 cubic inches and a horsepower of 100.5 with compression ratio of 6.3 to 1. Super Red Diamond engines are available in three sizes: 372 cubic-inch displacement size develops 144 horsepower; 406 cubic-inch displacement size, 154 horsepower; the 450 cubic-inch displacement size, 162 horsepower. Compression ratio of the Super Red Diamond is 6.3 to 1.

A complete selection of transmissions is available in each line.

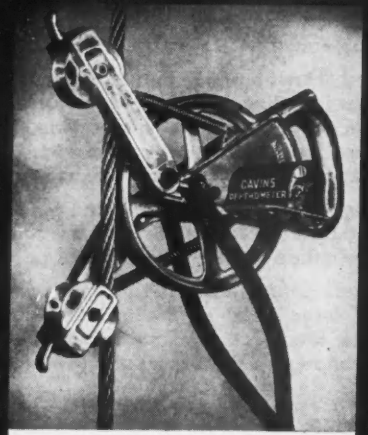
For additional information, write International Harvester Company, Motor Truck division, 180 North Michigan Avenue, Chicago 1, *referring to* WORLD OIL *item* 69.

Here's the Accurate Way to take Wire Line Measurements

Easy to use

Light and handy to carry

No more "Stringing-in" Guess Work



Hundreds of Cavins Depthometers are in successful service giving their owners direct-reading, accurate well measurements. This strong, simple device comes in a handy carrying case (weighs only 17 pounds)—is put on the line in a few seconds, and tells you where bottom is quickly and dependably. —Write for folder to The Cavins Co., 2853 Cherry Ave., Long Beach 6, California.

Gives you accurate depth

Direct reading

Pays for itself in a short time

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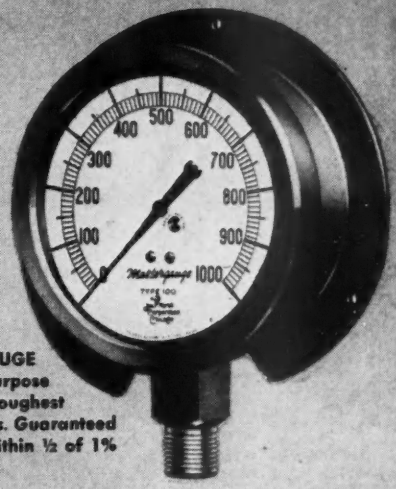
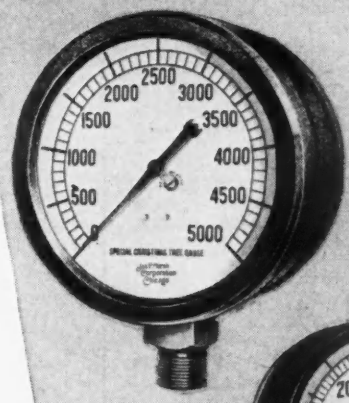
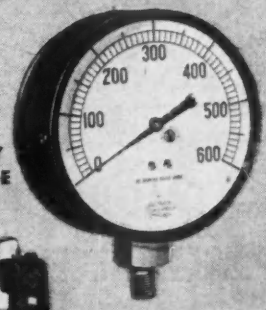
The Marsh branch plant at Houston offers shipment from stock and facilities for repairing all makes of gauges.



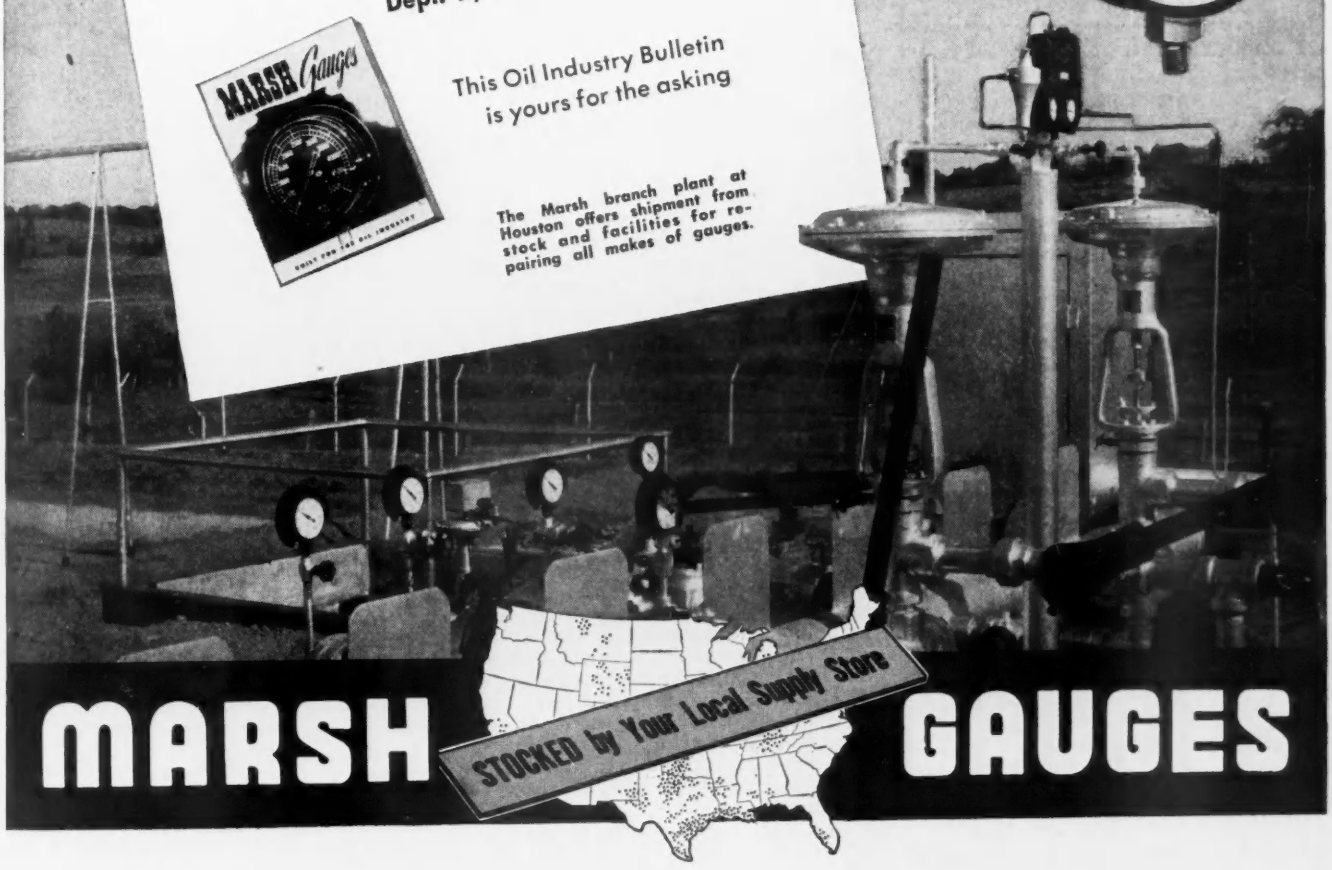
MASTERGAUGE—the all-purpose gauge for toughest applications. Guaranteed accurate within ½ of 1% of reading.



CHRISTMAS TREE GAUGE—a gauge that incorporates ruggedness and accuracy beyond all others.

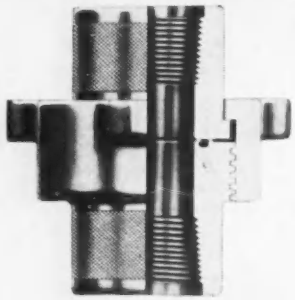


OIL COUNTRY BOILER GAUGE



MARSH GAUGES

For DISTILLATE



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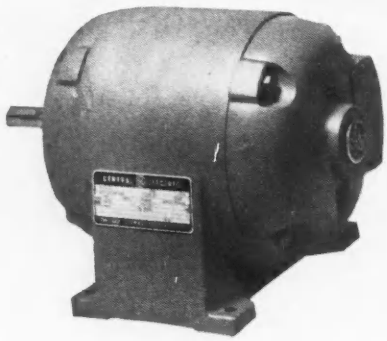
NEW EQUIPMENT

SUPPLEMENTING COMPOSITE CATALOG

70—Capacitor Motor

This item supplements General Electric Company data as shown on pages 1809-1820 of Composite Catalog, 17th Edition.



A new integral-horsepower capacitor motor is for use wherever power supply demands single-phase operations.

Capacitors are mounted on the base of the motor, and there is no conduit box on the side. The conduit box has been replaced by a built-in terminal board inside the end shield for simple wiring.

The new Tri-Clad motor, of cast iron construction, is lightweight, and has a totally enclosed built-in starting switch to keep foreign matter from the contacts.

In ratings from ½ to 5 horsepower, the high-torque motors are available in two types: Type KCS, capacitor-start, and Type KCR, capacitor-run. They differ only in starting current, not in output characteristics.

For additional information, write for Bulletin GEA-5401, General Electric Company, Schenectady 5, N. Y., *referring to* WORLD OIL *item* 70.

71—Rotary Meter

This item supplements Bowser, Inc., data as shown on pages 715-716 of Composite Catalog, 17th Edition.

A new lightweight, compact 350 gallons per minute rotary meter, the "Rotorol," can be used for tank truck, bulk plant, pipe line, industrial, marine, high-speed fueling and other liquid measuring jobs.

Dynamic balance of the rotor assembly preserves accuracy by eliminating hydraulic and mechanical stresses. Rotor shaft and cam rollers have stainless steel ball bearings and needle-type roller bearings, which offer practically no resistance to liquid flow on gravity or pump installations. Interior rotating parts are aluminum die cast, anodized aluminum and cadmium plated steel to resist rust and corrosion.

Positive displacement measurement is accomplished in a precision chamber during each quarter revolution of the rotor. A gear change permits flow through the meter in either direction.

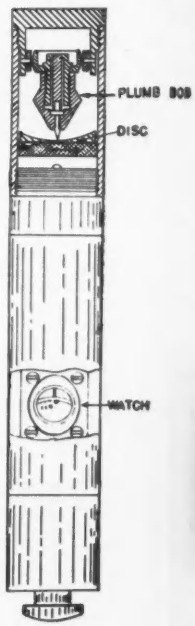
The meter has working pressures to 125 pounds per square inch. It has standard three-inch pipe flanges and may be installed vertically or horizontally. It is available with ticket printer or with large-numeral, straight reading dial which may be set to face any of eight directions.

For additional information, write Bowser, Inc., Fort Wayne 2, Indiana, *referring to* WORLD OIL *item* 71.

72—Drift Indicator

This item supplements Eastman Oil Well Survey Company data as shown on pages 1401-1428 of Composite Catalog, 17th Edition.

On many Rocky Mountain wildcats, maximum contract limits of deviation from vertical while drilling have been allowed. A mechanical high-angle drift indicator has been developed which will measure up to 30 degrees deviation.



The high-angle unit has a short plumb bob, with a cup-shaped aluminum recording disc. Concentric rings are burnished in the metal disc, representing four-degree intervals of drift, from 0 to 30 degrees maximum. Because of the great arc of the 30-degree swing of the plumb bob, and to keep the upward movement of the disc cup to a minimum, the disc is made with a concave upper surface to conform to the arc of the stylus, which punches small marks in the soft aluminum to record drift.

Operation of the indicator is similar to that of the earlier models. A watch is set for the amount of time it will take for the instrument to reach the bottom of the well, and a surface watch is set at the same time for reference. The instrument is then placed in a barrel and run into the well. When the indicator reaches the desired depth, the plumb bob comes to rest vertically, while the axis of the instrument coincides with the well bore. The recording disc is positioned centrally, and relationship between the suspended point of the plumb bob in respect to the concentric lines on the disc measures degree of inclination of the well bore. Two recordings are made, with a 40-second interval.

For additional information, write Eastman Oil Well Survey Company, P. O. Box 1500, Denver 1, *referring to* WORLD OIL *item* 72.

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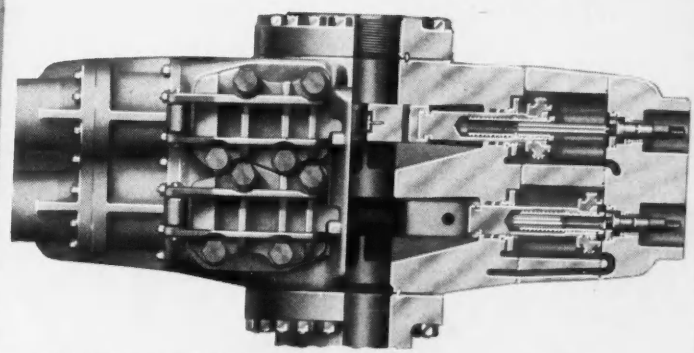
THE SHAFFER LINE OF PRESSURE CONTROL EQUIPMENT IS THE MOST COMPLETE IN THE INDUSTRY!

Shaffer gives you a choice of either *Hydraulic* or *Mechanical* Cellar Control Gates—plus a full range of other pressure control equipment!

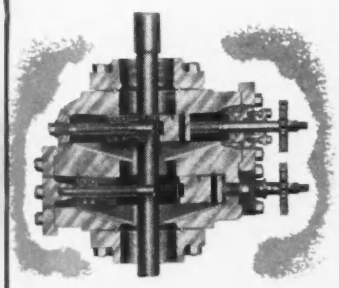
Regardless of your pressure control requirements, there's a Shaffer product to fill them . . . *Hydraulic* Cellar Control Gates . . . *Mechanical* Cellar Control Gates (both *Single* and *Double*) . . . Combination Rotating Blowout Preventers and Strippers . . . a complete line of advanced Casing and Landing Heads . . . various types of Tubing Heads, Flow Beans and other equipment for *every* pressure control requirement. The unusually diversified line of Shaffer field-tested equipment includes . . .



SHAFFER HYDRAULIC CELLAR CONTROL GATES—the most advanced, most compact, most efficient hydraulically-operated gates on the market.

- Two separate ram compartments unitized into *one* compact body for maximum protection and space saving.
- Even in sizes as large as 13⅜" you get *two* ram compartments in an overall height of only 30"—*smaller sizes even less!*
- Completely enclosed—no outside moving parts to become damaged or corroded by chemical muds dripping into cellar.
- New simplicity in changing rams—simply unbolt and open two doors, change rams, then close and bolt the doors. A new high in simplicity, speed, convenience!

The above are only a few of the *many* far-reaching advancements designed into the new Shaffer Hydraulic Cellar Control Gate. Available in a full range of sizes and pressure ratings. Write for full details!

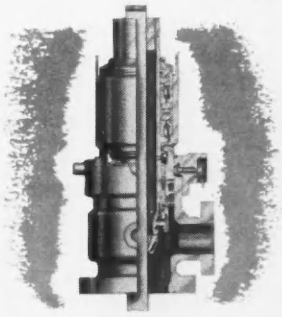


Shaffer Double Cellar Control Gates—the famous *mechanically* operated cellar control gates used by leading operators throughout the world.

- Can be operated by *any* type of power—air, electric or steam drive—*plus added protection of full manual standby!*
- *Two* ram compartments in *one* body assures maximum space-saving compactness . . . less than 29" overall height in sizes as large as 13⅜"—smaller sizes even less.
- Rams are quickly changed by simply removing one end cover—an easy, simple operation.

Shaffer Double Cellar Control Gates also provide many other unique features and are available in a full range of sizes and pressure ratings to meet any requirement.

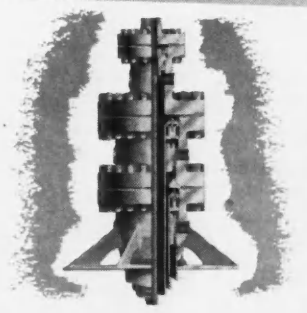
For applications where maximum conservation of vertical space is not essential, Shaffer also features a complete line of mechanically operated *single* Cellar Control Gates.



Shaffer Combination Rotating Blowout Preventer and Stripper—combines in *one* unit every necessary feature for complete and fool-proof pressure control while drilling under pressure . . .

- Maintains continuous seal around all elements in the drill string—square, hexagonal, octagonal or round—rotating or not.
- Automatically expands and contracts to fit varying diameters in the string such as tool joints, couplings and drill collars.
- Not only maintains its seal while the drill string is rotating, but also while stripping pipe in or out of the well.
- Quick-Releasing Bonnet permits passing abnormally large tools such as bits and reamers through the unit quickly and conveniently.

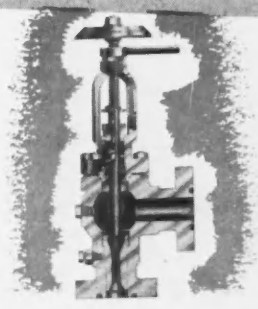
There is nothing as *complete*, as *advanced*, as *simple* as this Shaffer unit for maintaining complete pressure control while the drill string is rotating or being stripped in or out of the well!



Shaffer Landing, Casing and Tubing Heads—used in all major oil producing countries throughout the world for modern compact casing or tubing suspensions.

- Available in many types and various packing arrangements, including types where no internal threads are used for holding packing element in place.
- For maximum compactness, Base Heads and Combination Base, Casing and Tubing Heads are available that combine several units in one.

From Shaffer you can also obtain a full line of advanced Tubing Heads, Multiple Zone Hook-Ups and other equipment to complete your pressure control installation.



Shaffer Adjustable Flow Beans—provide means for controlling the flow of fluid under pressure. Shaffer pioneered Adjustable Flow Beans and offers a wide range of different types for drilling, production and refinery operations—all embodying unique advancements found nowhere else. Shaffer Adjustable Flow Beans are available with Conical, Micro and electrically-heated Thermo Tips in both regular and hard metal designs. All popular sizes—both flanged and screwed connections to meet any installation requirement.

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See pages 4433 to 4496 of the 1950 Composite Catalog.

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73—Plastic Pipe

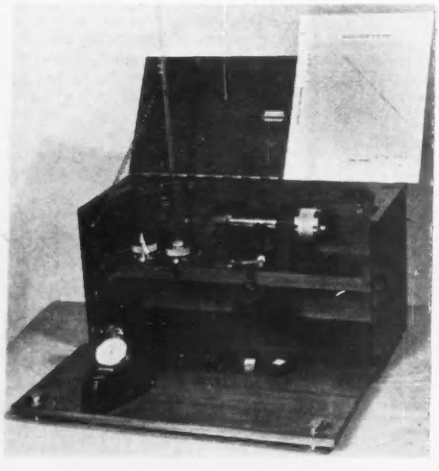
A new lightweight, flexible, corrosion-resistant plastic pipe can be used for transmission of natural or artificial gases, plating tank solutions, cold chemicals, and especially for water intended for human consumption.

A tensile strength of 1400 pounds per square inch is claimed for the pipe, which is known as Carlon "EF." Dialectric strength is 500 volts per mil (⅛ inch thickness), and flexural strength ranges from 1500 to 1700 pounds per square inch.

For additional information, write Carter Products Corporation, 10211 Meech Avenue, Cleveland 5, Ohio, *referring to* WORLD OIL *item 73.*

74—Permeameter

Horizontal or vertical permeability of core samples can be determined either at the well or in the laboratory with a new portable permeameter, the "Porta-Perm."



Two high-speed, diamond saw blades cut core samples into five-eighths inch cubes. A petroleum solvent and hot plate are also in the preparation kit included with the permeameter.

Prepared samples are inserted into the chamber of the permeameter and air pressure in the chamber is increased by means of a rubber bulb. As the air passes through the sealed-off sample, pressure in the chamber drops. This drop is indicated by a falling water column, in a glass tube, and is timed by a stop watch. Curves are furnished of Time vs. Permeability, so that the degree may be measured directly.

For additional information, write Guenther Instrument Company, 2420 Bissonnet, Houston 5, *referring to* WORLD OIL *item* 74.

75—Welder

The "Arc Booster" and a reserve capacity enable a new industrial type welder, the "Fleetwelder 200," to be used on both thick as well as thin material. Rated maximum load of the unit is 250 amperes. Electrodes ranging in diameter from 5/64-inch to ¼-inch may be used with it.

The Arc Booster adjusts the welder to start the arc automatically when the electrode touches the work on either thin or heavy material. A control handle on the case adjusts the current, and a dial indicates the current setting.

For additional information, write The Lincoln Electric Company, 13010 Coit, Cleveland 1, O., *referring to* WORLD OIL *item* 75.

76—Rubber Pinch Valve

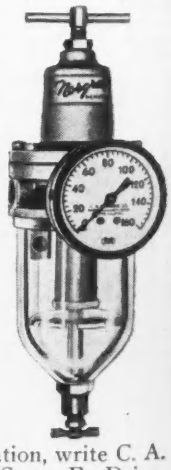
Non-corrosive and non-clogging, a new rubber pinch valve is applicable to any pipe line which does not handle materials damaging to rubber or high temperature goods.

The valve is comprised of rubber tube, pinching mechanism and housing. A steel yoke with two half round steel members that are brought to a closing position by a screw arrangement comprise the pinching mechanism. All operating parts are outside the rubber tube and are contained in a sealed cast aluminum alloy housing.

For additional information, write Ray Wilcox Company, 1436-37 Land Title Building, Philadelphia 10, *referring to* WORLD OIL *item* 76.

77—Filter-Regulator

Filtering and pressure regulating are combined in one new unit, which is only 11 inches high. It is designed for use with air and any non-corrosive gas at pressures up to 125 pounds per square inch, and ambient temperatures up to 120° F.



The filter has a directional inlet which creates centrifugal action and throws moisture and entrained solids against transparent bowl, where they run down into a quiet zone beneath baffle.

For additional information, write C. A. Norgren Company, 222 Santa Fe Drive, Denver 9, *referring to* WORLD OIL *item* 77.

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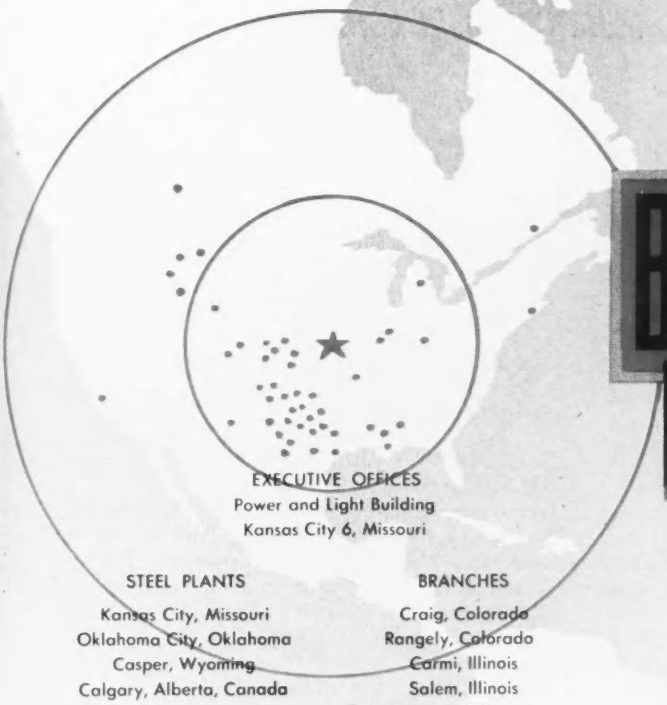

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In view of the ever-increasing importance of the oil and gas industry of the State of Texas and the fact that the number of pioneers of this industry is decreasing from year to year, it has been deemed advisable to present a history of the industry in this State, based on authentic information and prepared for ready reference.

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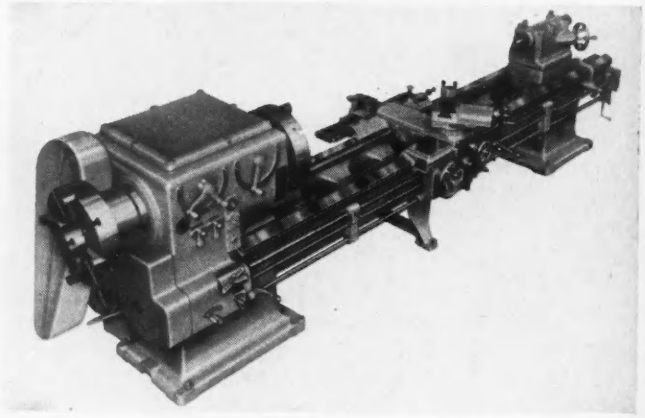
OTHER NEW EQUIPMENT

78—Hollow Spindle Oil Field Lathe

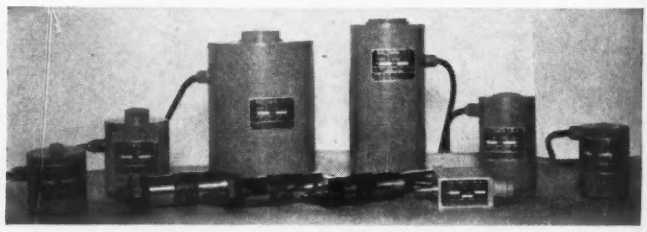


A new hollow spindle oil country lathe with nine-inch bore is rated as a 20-inch size, and will swing 27 inches over bed and carriage wings. It is available with center distances starting at 48 inches, has an 18-speed geared headstock, and is arranged for 20-horsepower main drive motor.

The 18 spindle speeds range from 10 to 362 revolutions per minute. An electric brake with apron spindle control starts, stops and reverses the spindle. Quick change feed box is totally enclosed, automatically lubricated, and has 63 feed and thread changes.

For additional information, write for Bulletin HS-111, The R. K. LeBlond Machine Tool Company, 1947 Edwards Road, Cincinnati 8, *referring to* WORLD OIL *item* 78.

79—Load and Pressure Cells

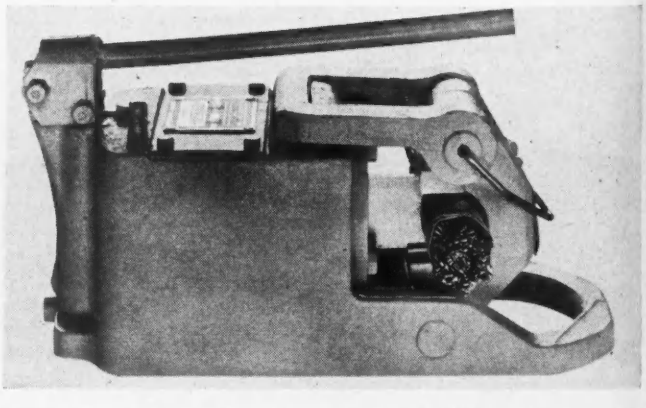


The sensitive elements of five new load and pressure cells, designated SR-4, are resistance wire strain gauges. In the load cells SR-4 gauges are bonded to a compression column, loads being indicated or recorded manually on self-indicating type instruments.

Two new compression type load weighing cells of 100,000 and 200,000 pounds capacity make a total of seven standard Type C cells, starting at 2000 pounds capacity, in the line.

For additional information, write The Baldwin Locomotive Works, Testing Equipment department, Philadelphia 42, *referring to* WORLD OIL *item* 79.

80—Manual Wire Rope Cutter



A wire rope cutter with a maximum capacity of 1½ inch wire rope weighs only 70 pounds and can be operated in any position.

Of all-steel construction, Hydrashear is manually operated, entirely self-contained, and does not have to be anchored when in use. It cuts wire rope through the application of hydraulic pressure.

For additional information, write Pell Cable Cutter Company, 55 New Montgomery Street, San Francisco, *referring to* WORLD OIL *item* 80.

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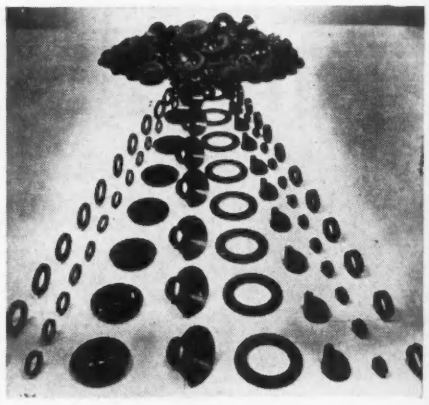
81—Rubber Compounds

Synthetic rubber compounds have been developed especially to resist the chemical action of petroleum products, their derivatives, and other industrial and commercial lubricants.

Buna N, Hycar or Neoprene-based, the compounds can be fabricated into gaskets, sleeves, washers, tubing, molded products, and extruded cross sections. Applications of these compounds include fuel lines, dust covers, filters, channels, vibration dampeners, and many other products intended for use where rubbers are subjected to the chemical action of petroleum products.

Rubbers having tensile strength from 500 to 2500 pounds per square inch, durometer hardness from 40 to 90, and elongations from 100 to 600 per cent can be supplied according to specifications. Various oxident additives will provide weatherproof qualities in the compounds, and these rubbers are also capable of withstanding temperatures ranging from



—60 to 225 degrees Fahrenheit.

The compounds can be formulated to meet either Society of Automotive Engineers requirements or specific applicational needs.

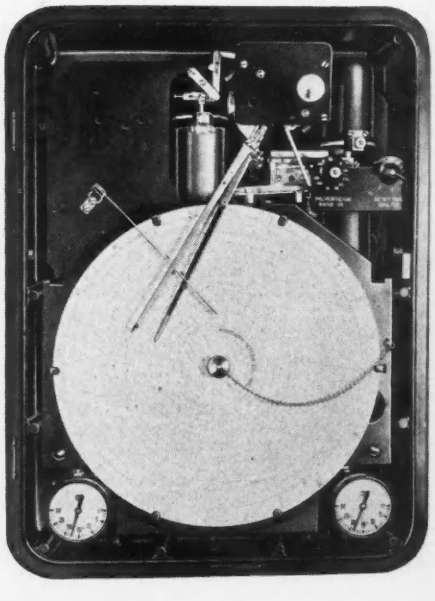
For additional information write The Stalwart Rubber Company, 192 Northfield Road, Bedford, O., *referring to* WORLD OIL *item* 81.

82—Flow Controller

Pneumatic instruments, Series A-88, for transmitting and controlling flow, pressure, liquid level and specific gravity have a minimum number of pivot points and moving parts. Sub-assemblies have been unitized and parts standardized for interchangeability.

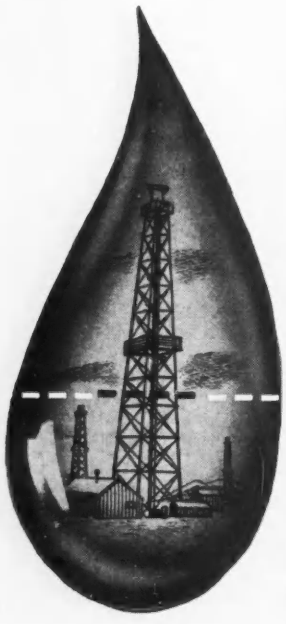
A new positioning device simplifies linkage alignment in the field. The instruments have a spring-closing, bellows-sealed reset valve calibrated according to time, and a nozzle assembly which permits adjustment of the nozzle without breaking tubing connections. The relay has a damping device and a self-cleaning primary orifice and a bypass arrangement for changing to manual control by turning one screw.

For additional information, write for Bulletin CT-49, American Meter Company, 49 East 41st Street, New York City, *referring to* WORLD OIL *item* 82.



First in

CANADA'S OIL FIELDS



The Royal Bank of Canada can answer your questions about Western Canada's fabulous oil development whether you are interested in oil financing in any of its aspects or wish sound advice on establishing business connections in Canada.

The Royal Bank has had branches in Canada's oil fields since the earliest days. Our branch in Turner Valley was opened in 1928 — in Leduc, we opened just one day after the first producing well was completed— in Devon and Redwater, our branches opened last spring. So closely identified has this bank become with Canada's oil development that it has become known as "Canada's oil bank."

Please address your enquiries to—
E. B. Durham, Supervisor,
The Royal Bank of Canada
Calgary, Alberta

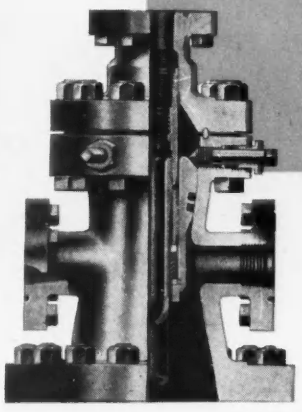
CANADA'S "OIL" BANK
See the Royal about Canada's oil

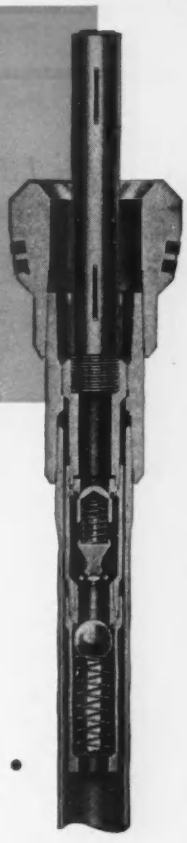
55 Branches in Alberta, the "oil" province. Over 720 branches in Canada, the West Indies, Central and South America. New York, London, and Paris. Head Office, Montreal.

ASSETS EXCEED $2,334,000,000

THE ROYAL BANK OF CANADA

GRAY SYSTEMS OF WELL CONTROL INCLUDE THESE DEVELOPMENTS





PATENT NUMBERS 2,241,288 AND 2,148,327

RELATED PATENTS INCLUDE NUMBERS:

2,103,431	2,162,179	2,150,887
2,157,964	2,358,677	2,241,333
2,148,360		2,442,548

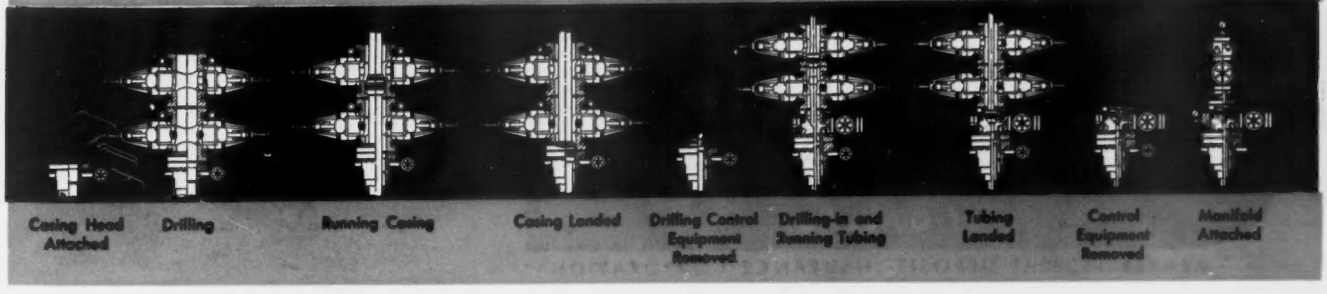
This simple combination of tubing head and tubing hanger provides complete control both of the annulus between casing and tubing and through the tubing during the performance of completion operations.

THE WHOLE IS THE SUM OF ITS PARTS

These parts, like other Gray equipment, are parts of a complete, coordinated system of well control. This system is designed to fulfill two specific functions: 1) to provide temporary seals for control until permanent seals are effected and 2) to allow for the removal of each part as soon as it completes its operating function, and thus to eliminate the operating hazards connected with its use.

GRAY TOOL COMPANY
HOUSTON

Rocky Mountain Representative: CARL MOULDEN, P. O. Box 1890, Casper, Wyoming



83—Gas Lift Valve

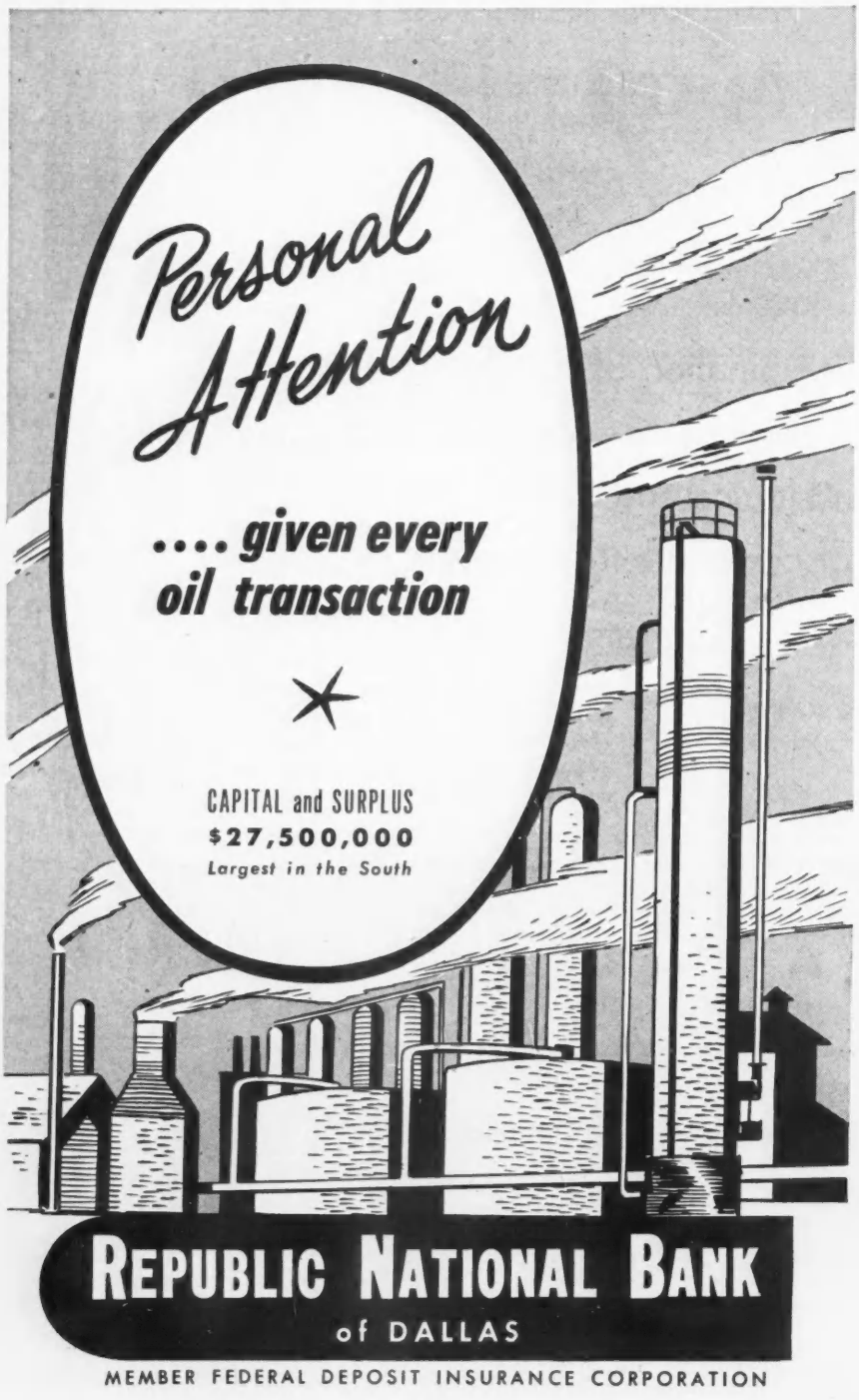
A new line of gas lift valves, made of solid bar "K"-Monel metal stock, are pre-set to the requirements of the well before delivery. The valve can be dismantled, reconditioned and reset, if necessary, at the well site.

A single moving part either opens or closes the valve in two opposite directions. It acts as its own check valve to prevent fluid in the tubing from flowing back through the valve into the casing annulus.

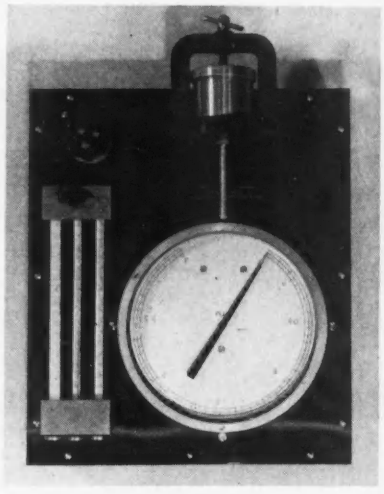
A straight automatic differential valve, it meters before it pops and cannot cut out.

Two types are available. The standard is externally mounted on a two-foot tubing nipple and a "pony" valve can be mounted on a two-inch pipe nipple as an outside valve and run inside four-inch drill pipe.

For additional information, write Spartan Gas Lift Equipment Company, 1544 West Mistletoe, San Antonio 1, *referring to* WORLD OIL *item* 83.



84—Permeameter



A new gas permeameter for determining the permeability of consolidated core sections uses a rotameter-type flowmeter to measure the flow of gas through the core sample. A triple tube rotameter with selector valve is used to give the instrument a range of from below 0.5 to more than 4000 millidarcys.

No liquids are used in the flowmeter or instrument, so that it may be transported in any position without making it necessary to refill or recheck.

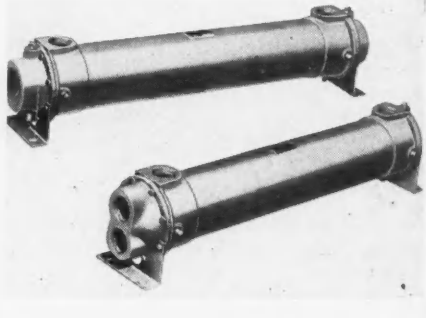
For additional information, write Ruska Instrument Corporation, 4607 Montrose Boulevard, Houston 6, *referring to* WORLD OIL *item* 84.

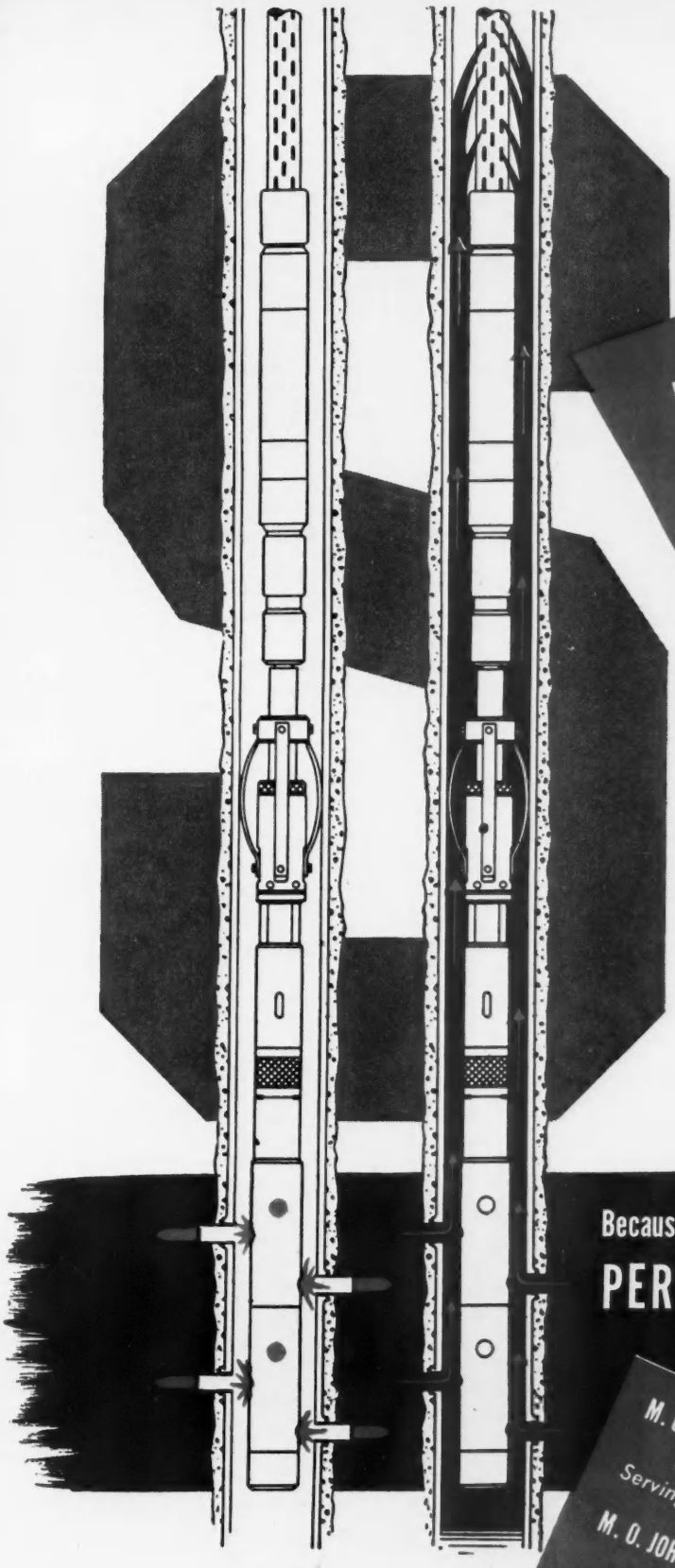
85—Heat Exchangers

A new line of stock Type "F" (fixed tube bundle) tube and shell type heat exchangers has been standardized for economical parts replacement.

The exchangers are made of corrosion-resistant tubing and are available in single pass or two pass types. They will handle either fresh or salt water requirements.

For additional information, write for Catalog 1049, Young Radiator Company, Racine, Wis., *referring to* WORLD OIL *item* 85.





INTERESTED IN SAVINGS?

The combination of the Johnston "Shoot-N-Test" Gun Perforator and the Johnston Formation Tester

SHOOT-N-TEST Trademark FORMATION AND CASING TESTING

- Saves wear and tear on equipment
- Cuts many hours off completion time
- Gets wells on production faster

Because They

PERFORATE and TEST

IN A SINGLE RUN

M. O. JOHNSTON OIL FIELD SERVICE CORPORATION
3035 Andrita St., Los Angeles 65, Calif.
Serving California—Rocky Mountains—Canada

M. O. JOHNSTON OIL FIELD EXPORT CORPORATION
EXPORT SALES
3035 Andrita St., Los Angeles 65, Calif., U. S. A.
CABLE ADDRESS "MOJOC"

The Johnston "Shoot-N-Test" Gun Perforator at moment of fire.

Following perforation formation fluid enters Johnston Tester Assembly.

86—Thread Sealer

Application of a new thread sealing compound, Thread-Tite, to pipe threads before joints are made up effects a positive seal against gases, brine, acids, water, steam and ammonia at high and low pressures and temperatures. In stick form, the compound may be carried in either pocket or tool kit. It may be applied to steel, aluminum, iron, brass, plastic, copper or any other type material.

The compound also protects threads from seizing or galling. Lubricating qualities permit drawing pipe joints, bolts and studs tighter than is normally possible.

The compound will not harden or dry out, and is not affected by vibration. As the material is used, the stick may be pushed forward in its case, so that it may be completely used. Each stick is supplied with a metal cap to prevent the compound from getting dirty or rubbing off on clothing.

For additional information, write Armite Laboratories, 6609 Broad Street, Los Angeles 1, *referring to* WORLD OIL *item* 86.

GRIP-TITE STEARNS— PIPE LINE ANCHOR ASSEMBLY

"The Only Positive Expanding Anchor"

The Grip-Tite Pipe Line Anchor Assembly with Stearns Pipe Saddle was originated and designed especially to meet your demand for positive and permanent hold-downs for all kinds of pipe line construction. They are particularly adapted to marsh and over flow lands as weights for your pipe line.

Grip-Tite Anchors cost only a fraction of cast iron or concrete weights. No heavy equipment is needed for their installation. They save time, labor and other handling expense.

Grip-Tite affords protection from heavy weight damage during installation. An expansion joint pad provides additional protection to pipe coating. They are field proved beyond any doubt.

Comparative cost charts are available upon request.

Write for literature.

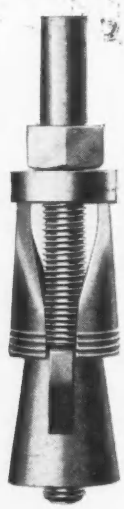
Grip-Tite earth anchors are described in a feature of this issue.

GRIP-TITE ROCK ANCHORS

Designed to meet the demand of the industry for permanent hold-downs in rock terrain for both pipe line and oil field construction. They are also adaptable as hold-downs in foundations and may also be used above ground in rock terrain in place of Grip-Tite Earth Anchors. Grip-Tite Stearns Pipe Line Anchor Assembly may be equipped with the Rock Anchor instead of Earth Anchor, for above gound pipe line construction in rock terrain.

They are made of CERTIFIED MALLEABLE and so constructed that when load is applied, expanding forces anchor wings against the walls of the hole to effect a positive grip at all times. Corrugations on the bearing surfaces of the wings prevent any slippage. The standard 2" size expands to 2⅜" and is equipped with ¾" rod; 3" size expands to 3⅜" and is equipped with 1" or 1¼" rod. Actual tests of 2" size equipped with ¾" rod show a breaking stength of 20,000 lbs.

Anchor Expanded



Ready to Install

Grip-Tite MANUFACTURING COMPANY

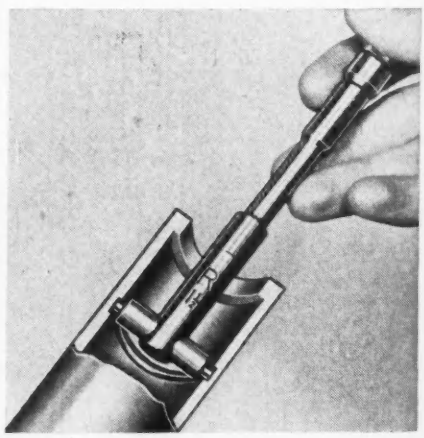
P. O. Box 45, Marshall, Texas

Export: R. S. Stokvis & Sons, Inc., 17 Battery Place, New York 4, N. Y.

Sold Through Supply Stores

87—Micrometer

Additions to the Rimat Inside Micrometer size range expand the line to cover all grooves for "O" ring packing from dash No. 11 through dash No. 79. The new, semi-standard models, in addition to the standard models, read continuously from .490 to 12.02 inches. Standard tip sizes are 1/16 inch outside



diameter and one-eighth inch on specific models. Special tips are available for measuring snap ring grooves as small as .015 inch in width.

The micrometers will take direct readings without transferring measurements, and have long handle extensions which reach into deep recesses.

For additional information, write Rimat Machine Tool Company, 1117 Air Way, Glendale 1, Calif., *referring to* WORLD OIL *item* 87.

88—Protective Coatings

Two new widths, 18 and 24 inches, complete the Tapecoat line of protective coatings in tape form. The new widths are particularly adapted for coating field joints on large diameter pipe, protection of large bends, wrapping mechanical couplings and patching transmission lines.

For additional information, write The Tapecoat Company, Evanston, Ill., *referring to* WORLD OIL *item* 88.

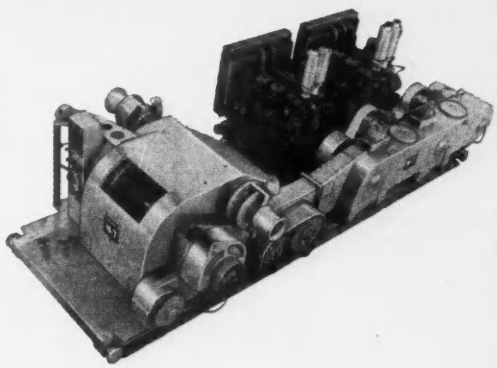
There's a BREWSTER RIG to fit any job—BETTER!

All with MATCHED EQUIPMENT

. . . to 8500′

BREWSTER **N-7**

Here's POWER to spare! Reasonable INITIAL COST, high PORTABILITY, ECONOMY of operation and maintenance has proved the N-7 fits the job of 8500′ programs—better. And like all Brewster rigs, it has added advantages of perfectly MATCHED EQUIPMENT and 24-HOUR FIELD SERVICE anywhere in U. S.



6-S SWIVEL

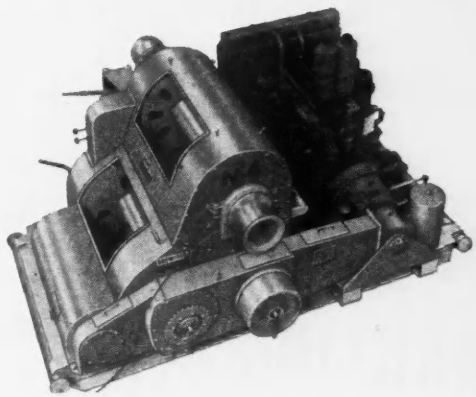
TB 200 BLOCK

RS 22 ROTARY

. . . to 5500′

BREWSTER **N-4**

SPEED and FLEXIBILITY characterize the Brewster N-4. Entirely air controlled, Torque converter(s) automatically supply maximum engine power with minimum engine effort. It's easily moved in one load. In single or double drum models—one or two engines—single or twin torque. "Hottest" rig in years.



4-S SWIVEL

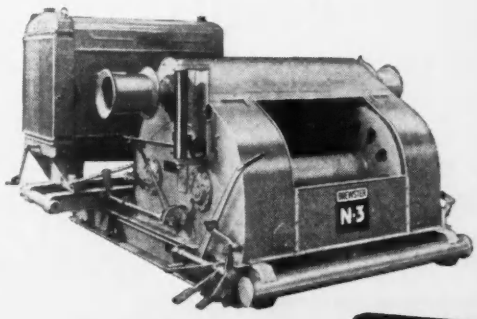
H-100 BLOCK

RS-18 ROTARY

. . . to 3500′

BREWSTER **N-3**

Easy to move—fast to rig up the highly portable N-3 is unitized on a single skid with all controls at driller's position. The ideal rig for shallow drilling to 3500′ or deep well servicing. The N-3 is available with single or double drum. Removable front drum cover section for convenience in well servicing.



3-S SWIVEL

H-50 BLOCK

OB-12-L ROTARY

THE BREWSTER COMPANY, INC.

Manufacturers of Drilling Equipment Since 1918

SHREVEPORT, LOUISIANA

Brewster Drilling Equipment is Sold by:

APEX EQUIPMENT CO.
BOVAIRD SUPPLY CO.
INDUSTRIAL SUPPLY CO.
MURRAY BROOKS, INC.
REAMS SUPPLY CO.
HALEY SUPPLY CO.
Calgary, Canada

BREWSTER MATCHED Drilling Equipment

89—Fuel Vaporizers

A new four-page illustrated bulletin describes a completely re-designed fuel vaporizer to power gas engines. It gives full operational data on this power source, explains the process by which the vaporizer strips volatile fractions from pipe line or lease crude and makes them directly available to the engine carburetor, and gives basic crude requirements.

Illustrations include a detailed flow diagram and dimensional sketch of the 40-horsepower fuel vaporizer. Specifications and capacities tables cover the 20, 40, 110 and 300-horsepower units.

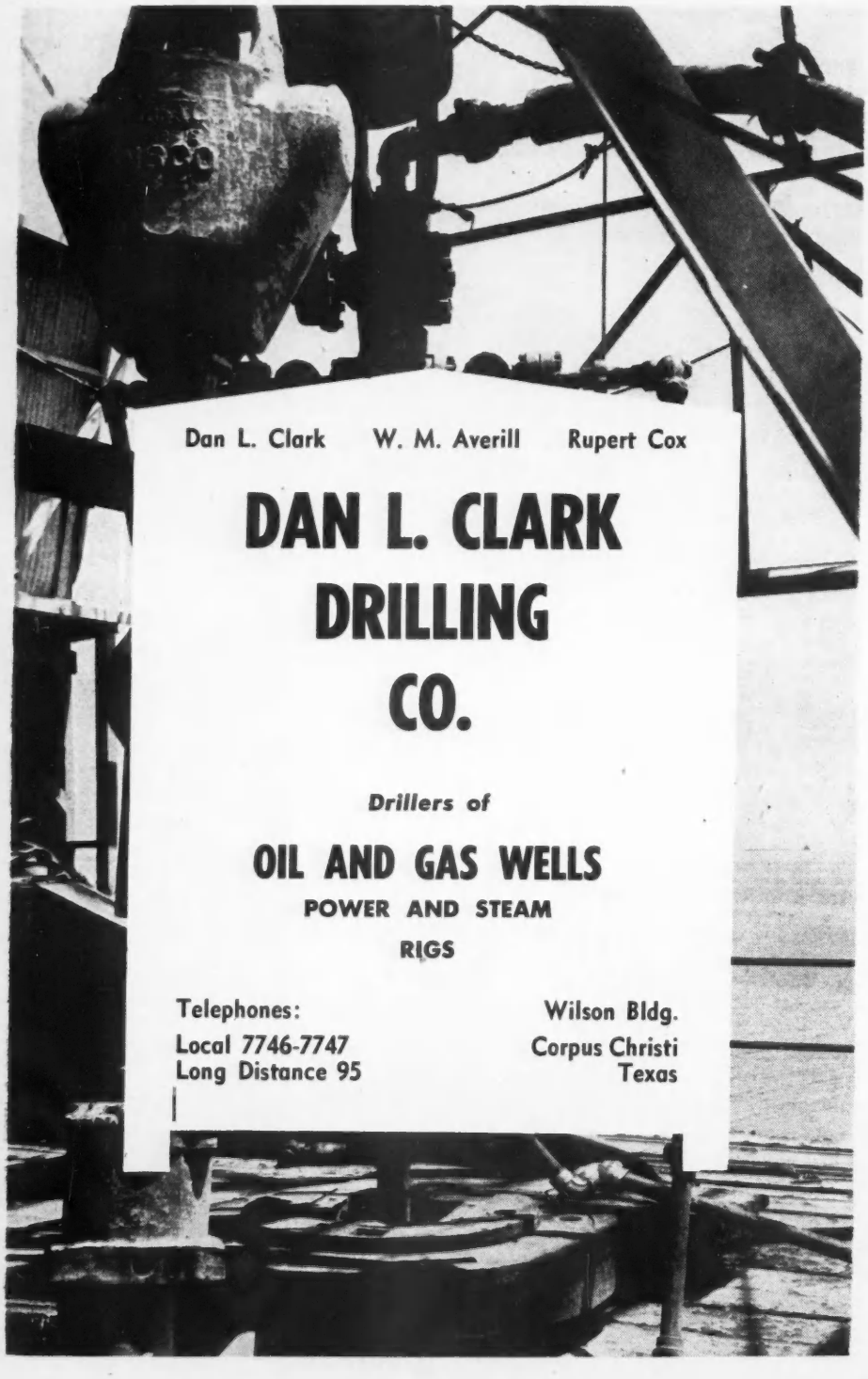
For a copy of this bulletin, write Black, Sivalls and Bryson, Inc., 720 Delaware, Kansas City 6, *referring to* WORLD OIL *item* 89.

90—Hard-Facing

A manual covering the common uses of hard metals on drilling equipment, "Oil Field Applications of Stoody Hard-Facing Alloys," has been published in a Spanish translation. In the new brochure, all applications are described in both English and Spanish with illustrations titled in both languages, making it doubly valuable for use in training schools conducted by oil companies in Spanish-speaking countries.

The latter part of the book treats of various hard-facing alloys commonly used in drilling operations. Included are the sizes and styles of Available Stoody alloys, with flame adjustment for gas application and recommended amperages for electric use.

For a copy of this manual, write Stoody Company, Slauson Avenue at Sorenson, Whittier, Calif., *referring to* WORLD OIL *item* 90.



91—Flow Control Unit

A new 16-page illustrated booklet gives complete engineering specifications on the O-C-T "JE" flow control unit. It also gives weight and price comparisons with conventional wings.

For a copy of this booklet, write Oil Center Tool Company, 1912 Airline Drive, Houston, *referring to* WORLD OIL *item* 91.

92—Tubing Swabs

A new use for tubing swabs—to clean out drill pipe and to prevent pitting—is discussed in an illustrated eight-page catalog.

Practical swabbing methods are explained in detail by reports from the field.

For a copy of this booklet write Mechanical Manufacturing Company, P. O. Box 1001, Fort Worth 1, *referring to* WORLD OIL *item* 92.

93—Electric Plants

"Electricity at your service for any purpose anywhere" is the theme of a new electric plant catalog. The eight-page, two-color booklet covers the complete line of Onan gasoline-driven electric plants. Special accessories for the plants are itemized. A Model Guide and General Information section points out the difference between AC, DC and battery charging models, and gives instructions for choosing the proper type, size and starting method.

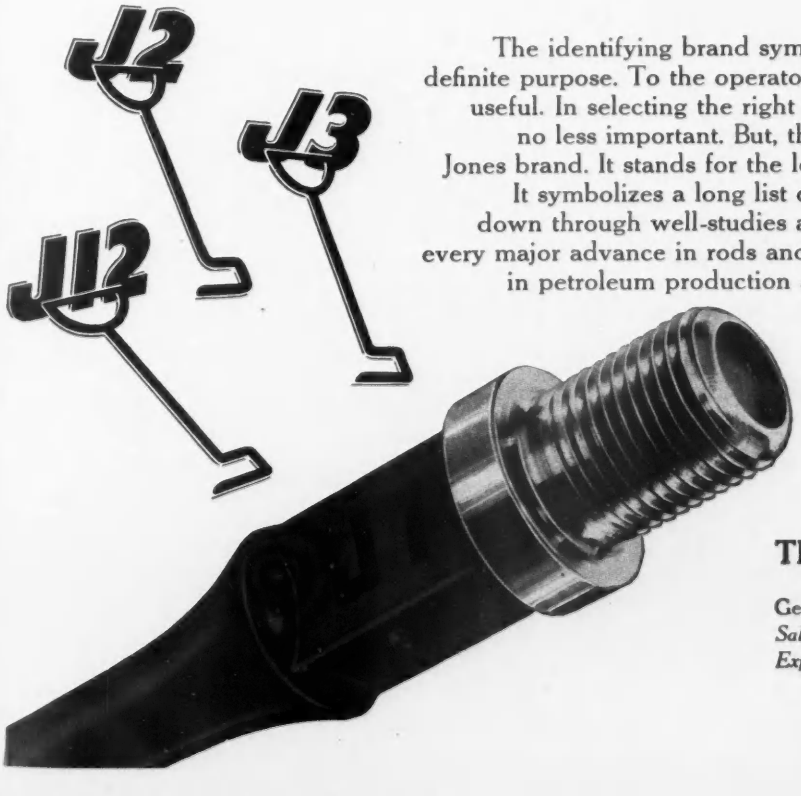
For a copy of Folder No. A-168, write D. W. Onan & Sons, Inc., 3621 Royalston Avenue, Minneapolis, *referring to* WORLD OIL *item* 93.

94—Arc Welders

A new four-page illustrated folder shows and describes 15 features of gasoline engine driven arc welders. It also gives specifications for ten different models of gasoline engine driven arc welders and combination models of arc welders and power units.

For a copy of this folder, write Hobart Brothers Company, Box DM-853, Troy, Ohio, *referring to* WORLD OIL *item* 94.

A BRAND WITH A MEANING...



The identifying brand symbols on each Jones sucker rod serve a definite purpose. To the operator who keeps rod records, they are especially useful. In selecting the right rods to run in a particular well, they are no less important. But, there is a far more important meaning to the Jones brand. It stands for the leadership of more than half a century. It symbolizes a long list of "firsts" from the first all-metal sucker rod down through well-studies and research and includes practically every major advance in rods and their use. It is instantly recognized by those in petroleum production as a mark of quality in sucker rods.

THE S. M. JONES COMPANY
(Subsidiary of Buffalo Bolt Company)
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

Men in the Industry NEWS

Frank E. Buttlerfield

Fletcher B. Emerson

Fletcher B. Emerson has been appointed director of the new Training division of the Industrial Relations department of Continental Oil Company. The new division will coordinate and broaden the training activities of the company.

Emerson, a graduate in civil engineering of Virginia Military Institute, was formerly special assistant to Continental's president. He joined the company as a roustabout in the New Mexico fields in 1939.

Frank E. Butterfield, formerly chief clerk in Continental's Crude Oil Trading department, has been promoted to assistant manager of the department. He has been with Continental since 1930 except for four years of Navy service during the war.

R. R. Johnson, Jr., is now scout and landman for the East Texas division, succeeding **R. L. Bentley,** resigned.

•

Horace C. Thompson, Tulsa, has joined the Industrial Relations department, Stanolind Oil and Gas Company, at Oklahoma City.

•

H. S. Gibson has been appointed managing director of Iraq Petroleum Company, Ltd., and associated companies. He succeeds **J. Skliros,** retired.

Gibson joined Anglo-Persian Oil Company, Ltd., as production engineer in 1922 and by 1945 was general fields manager (production). He returned to England in 1949 and took charge of Anglo-Iranian's Research station in Nottinghamshire.

Skliros, a member of the board of directors, had been managing director for 15 years.

•

Dr. R. E. Baker, former manager of the Gas department, New Orleans area, Shell Oil Company, has retired after 25 years with the company.

•

Ellis H. Wiet, real estate manager for Skelly Oil Company, has retired from the firm with which he has been associated since 1933, and will enter the investment securities business.

Howard E. Bradley, formerly with Phillips Petroleum Company, has joined Portable Drilling Corporation as Central Oklahoma representative, with headquarters in Oklahoma City. **Melburn H. (Bill) Brown** has resigned as assistant to the superintendent of Parker Drilling Company, to become drilling superintendent for Portable at Tulsa. **Leslie B. Riggins, Jr.,** has joined Portable as chief engineer and geologist.

•

H. B. Hurley, assistant regional general manager of Continental Oil Company, Fort Worth, has resigned to become vice president of Republic Natural Gas Company, Dallas. Hurley had been with Continental 23 years. He joined the Production department at Ponca City, Okla., in 1926, and worked in Oklahoma, Texas and New Mexico.

•

Dow Snyder, former accountant for Sohio Petroleum Company, resigned to join Eason Oil Company, Oklahoma City.

•

Edwin L. Smith has been named vice president in charge of foreign operations for The Superior Oil Company, and will be concerned principally with operations in the Middle East area.

Frank Ittner has been appointed vice president in charge of exploration, Pacific division, and will headquarter in Los Angeles.

•

P. W. Thirtle

Alvin Untermeyer has resigned as a director of Sinclair Oil Corporation after nearly 20 years with the organization. He is succeeded by **P. W. Thirtle,** who has been general auditor and comptroller of the parent Sinclair company since its formation in 1916. He has been a director and vice president of the parent company and many of its subsidiaries.

•

W. Armstrong Price, consulting geologist of Corpus Christi, Texas, joined the staff of the new Department of Oceanography at A. & M. College of Texas, to teach graduate courses and conduct research in geological oceanography and continue his studies of the geology of the coastal Pleistocene formations.

Hal W. Stewart has been appointed to the new position of assistant general counsel of The Ohio Oil Company. He has been an attorney in the Legal department for 27 years. In his new position, he will assist in the general work of the office of A. M. Gee, general counsel.

Stewart, a graduate of the University of Virginia School of Law, joined The Ohio in 1922 at Shelby, Mont.

Hal W. Stewart

•

Carl J. Westlund has purchased the stock of **George G. Johnson** in Westlund-Johnson Drilling Company and Westlund & Johnson, Inc., and the names of the two firms have been changed to Westlund Drilling Company and Carl J. Westlund, Inc., respectively.

W. C. (Curly) Murphy, formerly with Carl B. King Drilling Company, has purchased an interest in both firms and is in charge of all field operations.

•

Don S. Kennedy, formerly executive vice president of Oklahoma Gas and Electric Company, has been named president of the company succeeding **George Ade Davis,** retired. Kennedy has been with the company since he graduated from the University of Arizona in 1923. He served as adjutant general of Oklahoma during World War II.

•

J. W. Darnell, landman at Clinton, Okla., for Sinclair Oil and Gas Company, has resigned and will engage in the oil business as an independent with headquarters at Clinton. He is succeeded by **John C. Noble,** former scout in Northern Oklahoma who in turn is succeeded by **J. W. Kaboth** who will work out of the Oklahoma City office.

•

H. G. Nething ended a 50-year oil career when he retired from service with Stanolind Oil and Gas Company. The former field superintendent for Stanolind in the Ellinwood area of western Kansas was honored by his company and fellow workers at a dinner in Great Bend, Kansas.

•

Clarence M. Wanbaugh, Ohio and Michigan oil man, received a diamond-studded emblem in recognition of his 55 years service with Sun Oil Company. He is Sun's drilling tool foreman for the Gladwin, Mich., district.

WHELAND'S Exclusive UPSIDE-DOWN VALVES make this the smoothest, most efficient steam pump on the market!

WHELAND DUPLEX STEAM SLUSH PUMP

Model H-20000-BB.....16½"x8"x20" with Cast STEEL Fluid End.
Model H-20000-BA.....16½"x8"x20" with Semi-steel Fluid End.

BULLETIN GIVING MECHANICAL DETAILS FREE ON REQUEST.

EFFICIENCY INCREASED 12% TO 15%

In the Wheland H-20000 steam pump the steam and exhaust piston valves are below the steam cylinders.

Every stroke of the piston drains and blows all condensate, scale or rust down and out of the cylinder. This construction increases the efficiency by 12 per cent to 15 per cent. This pump will maintain its stroke at a slower speed than any competitive pump on the market.

After one of these pumps had drilled more than 25 deep wells, it was dismantled and the cylinder carefully "miked". It was still in perfect condition with practically no wear.

The many exclusive Wheland features add up to more pressure, more mud and more dependability.

DRAMATIC PROOF—This is the pump used in putting out the Leduc fire! It could put up the mud and the pressure to do the job!

HOUSH DRILLING COMPANY SAYS:

C. N. HOUSH

Housh Drilling Company
GULF BUILDING
HOUSTON 2 TEXAS

LESTER G. HOUSH

November 15, 1949

The Wheland Company
Chattanooga
Tennessee

Gentlemen:

Our records of the highly satisfactory performance of Wheland H-20000 steam pumps influenced us to select them in our equipment standardization program. This program has been described in recent issues of THE OIL AND GAS JOURNAL, WORLD OIL, DRILLING, and THE DRILLING CONTRACTOR.

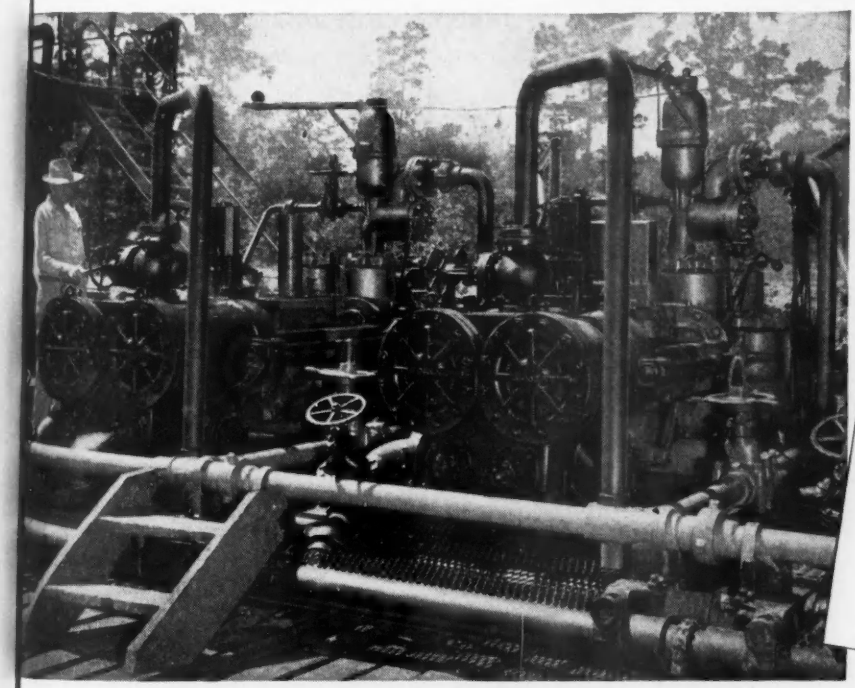
Your upside-down self-draining valve construction and the easily accessible fluid end are real features. We have found the performance of these pumps satisfactory in every way.

Yours very truly

HOUSH DRILLING COMPANY

By Lester G. Housh
Lester G. Housh

LGH/sl



Two Wheland H-20000 Steam Pumps unitized by Housh Drilling Company on first rig assembled under their new equipment standardization program.

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

DOMESTIC DISTRIBUTORS
Jones & Laughlin Supply Co.
Tulsa, Oklahoma
Stores and Offices in all Principal Oil Fields and Centers

EXPORT DISTRIBUTORS
Lucey Export Corporation
233 Broadway,
New York 7, N. Y.
Broad Street House
London E.C. 2, England

SLUSH PUMPS • CROWN BLOCKS • TRAVELING BLOCKS • DRAW WORKS

Transfers and Promotions:

M. P. Blacknall, formerly superintendent for Texas Pipe Line Company at Breckenridge, Texas, has been transferred to Electra, Texas, succeeding **Hal Basham** who has been transferred to the Pampa district. . . . **Don Shanks** and **J. W. Sigley,** scouts for The Texas Company, have been transferred from Shawnee, Okla., to Evansville, and from Evansville to Tulsa, respectively. **Everett Florey,** former South Texas division scout, has been transferred to Tyler, Texas, and **Irving King,** former scout at Tyler, has been moved to the Land department. . . . **J. W. Wingfield** has been made assistant manager of the Land department of American Republics Corporation. He succeeds **J. C. Snyder,** who has been transferred to a new position as attorney in the Legal department of the San Angelo office. **James B. Darby** has transferred to Houston from San Antonio as scout in Southeast Texas. He is succeeded by **Martin O'Brien.**

Harry McDaniel, pipe line superintendent, Wichita district, Cities Service Gas Company, succeeds **Frank W. Harriger,** retired, at Warrensburg, Mo. **K. A. Kimball** succeeds McDaniel at Wichita, and is replaced at Lawrence, Kansas, by **Ed Fitzpatrick,** foreman, Kansas City district. . . . **E. B. Wilson,** district geologist, Sun Oil Company, Tyler, has been transferred to Roswell, N. M., to head Sun's Geological department. **O. L. Hill** and **A. H. Talley** have been transferred from Dallas to Tyler . . . **K. W. Hagan,** scout for Mid-Continent Petroleum Corporation, has been assigned to the Production department in the same capacity and transferred from Shawnee, Okla., to Seminole, Okla. . . . **Frank A. Terry,** landman for Tide Water Associated Oil Company at Jackson, Miss., has transferred to Midland, Texas. . . . **Bruce Choate** has succeeded **George Norton** as district geologist at Casper for Atlantic Refining Company, with Norton being transferred to the Dallas office. . . . **Robert B. Austin,** The California Company, has been transferred from New Orleans to Denver on special geological assignment in Arizona, Colorado and Utah.

•

E. J. Jameson has been promoted to assistant manager of the Material and Traffic department, The Carter Oil Company. He is a graduate of Oklahoma A. & M. College, and has been with Carter since 1939.

•

Thomas J. Hanlon, who has been associated with the Sinclair Companies for 30 years, has retired. In 1932 he moved to Independence, Kansas, to take charge of all legal matters relating to pipe line operations.

•

Ralph A. Hockinson, formerly geologist for Paul H. Pewitt, Longview, has joined The Carter Oil Company, Tulsa, as coordinator between the Engineering and Geological departments.

L. G. Howell, M. N. Floyd and **E. L. Davidson** have organized Floyd Drilling Company, Shreveport.

•

Frank D. (Dutch) Lortscher has been named manager of Purchases and Stores department for Signal Oil and Gas Company, Los Angeles. Lortscher started with the company more than 22 years ago in the Signal Hill area. Active in the Purchasing Agents Association, he is president of the Oil Buyers group of the National Association.

Frank D. Lortscher

•

James J. Sullivan, vice president and director of Blair & Company, Inc., and director of Blair Holdings Corporation, and **James Carey Warren,** partner of A. M. Kidder & Company, have been elected directors of American Maracaibo Company.

•

R. E. Hart, former district landman at Jackson, Miss., for Cities Service Oil Company, has moved to Midland, Texas, as district landman there. **Earl H. Bryant** succeeds Hart at Jackson.

•

L. C. Kirby, formerly district geologist for Tide Water Associated Oil Company at Tallahassee, Fla., is now on a research assignment in Houston. His address is P. O. Box 1404.

•

Russell C. Conkling has joined Plymouth Oil Company as chief geologist for all operations west of the Mississippi River. He has been with Shell Oil Company and Phillips Petroleum Company but has been a consultant at Midland, Texas, since 1944.

Order Your Copy of 1949 World Oil Index

The complete editorial index covering all issues of WORLD OIL published during 1949 has been prepared and is bound separately in convenient pamphlet form. It will be sent free to all subscribers who write requesting copies.

Orders should be addressed immediately to the Circulation Department, Box 2608, Houston 1, Texas, as quantities are limited.

William H. Whaley has been appointed manager of the Insurance department, Mid-Continent Petroleum Corporation. He succeeds **Carolyn Anderson,** retired. Whaley was formerly with the Legal department of the Texas Pipe Line Company.

•

A. L. Snow has been appointed manager of the Patent department and elected a director of California Research Corporation, a subsidiary of Standard Oil Company of California. He succeeds **J. N. Adams,** retired.

•

Mrs. Carrie Estelle Doheny has sold interests in approximately 2570 acres of land and 72 producing oil wells in the Coalinga Nose, Pleasant Valley and Guijarral Hills fields in Fresno County, California, to Nassau Associates, Inc., New York, for a reported $32½ million.

•

D. E. Witt has been appointed assistant division land man for the Oklahoma division of The Texas Oil Company, with headquarters at Tulsa, and in his new assignment will assist in coordinating the company's Land department activities in Oklahoma, Kansas, Illinois, Indiana, Kentucky and Michigan.

•

Dr. Curtis H. Baylor, former professor of medicine at the American University of Beirut, Lebanon, has been appointed assistant medical director of The Texas Company.

Dr. Baylor was graduated from Johns Hopkins Medical School. He went to Beirut in 1938 as assistant professor of medicine at the University and was successively associate and full professor, terminating his post last June. In addition to his teaching, he was head of the medical service of the American University Hospital.

•

Clinton A. Leuth has been appointed district geologist for the Houston-Beaumont area for American Republics Corporation. After three years service as a lieutenant in Naval Intelligence, Lueth joined Union Producing Company in Houston, where he was active in Texas Gulf Coast geological work.

•

George S. Smith, formerly operating engineer, has been named plant engineer for Stanolind Oil and Gas Company's Elk Basin plant in Park County, Wyo. **Charles E. Buffum** and **Ralph E. Hartline,** formerly construction and technical service section supervisor, and senior research engineer, respectively, have been promoted to the posts of research group supervisors at Stanolind's laboratory in Tulsa. **Harold M. Lang,** formerly instrument shop supervisor at the laboratory, has been promoted to senior research engineer.

PB CASING PROTECTORS INSTALLED FROM TRANSFER SLEEVE TO DRILL PIPE IN LESS THAN FOUR SECONDS!

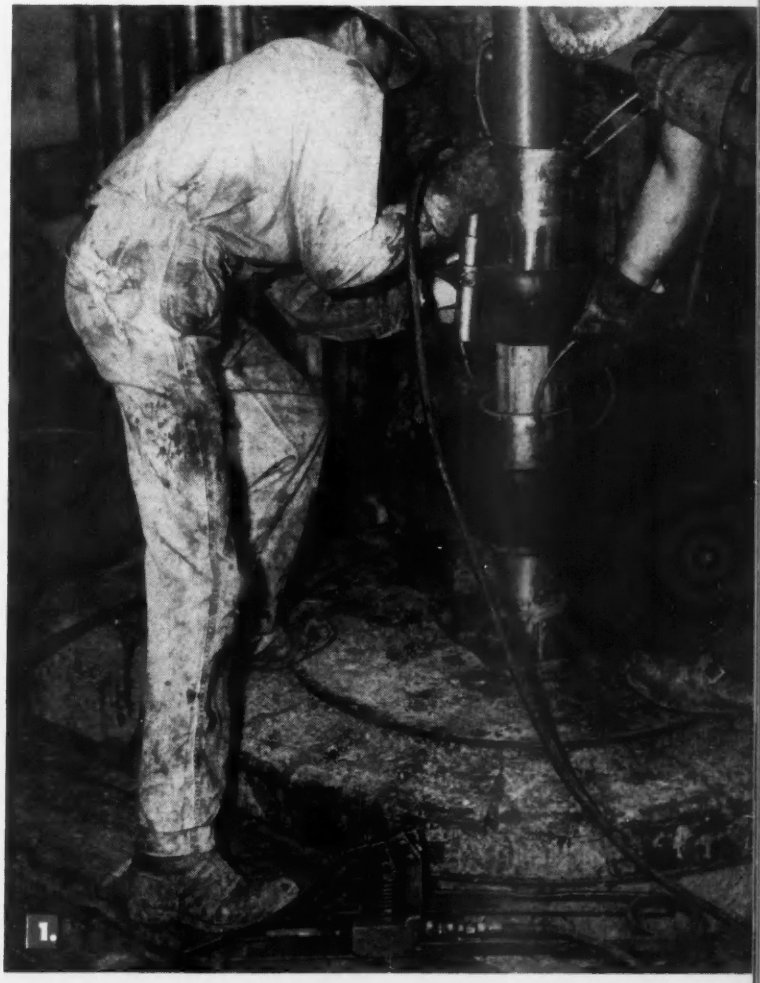
PB engineers fastest protector installation tools

Now AVAILABLE—PB's new lightweight hydraulic equipment installs protectors in a fraction of the time previously required . . . *from transfer sleeve to drill pipe in less than 4 seconds!*

One man can install protectors on drill pipe wherever or whenever needed—going into or coming out of the hole without breaking joints of a stand—or on the rack at your yard or at the rig.

This combination of PB "Field Proven" Protectors and new PB Hydraulic Push-Off Installation Service means *full* protection plus *money saved.* You save rig time—get on bottom quicker!

For a demonstration of this "years ahead" PB engineered installation equipment call your PB representative now.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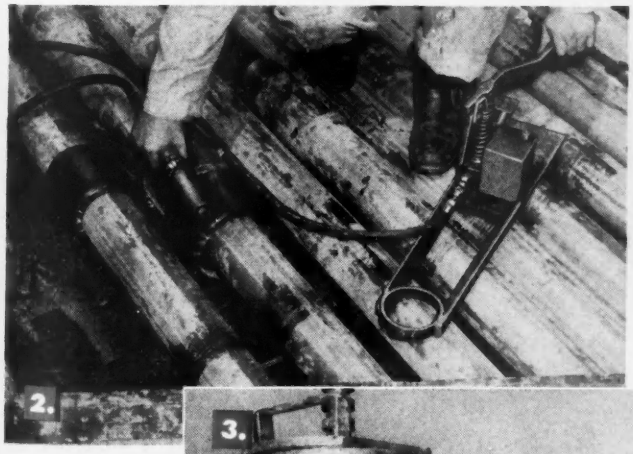
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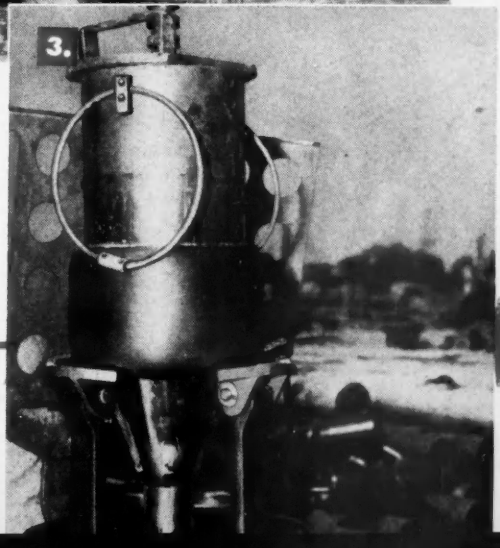

3.

1. New PB Hydraulic Push-Off Tool operated by PB service man while the crew is running pipe. Three strokes of the Push-Off Tool (controlled by foot pedal) give a hydraulic jack action which transfers the protector from sleeve to drill pipe in less than 4 seconds.

2. PB Protectors installed on racked pipe. Note how Push-Off Tool pump pedal is operated by hand.

3. Polished cone serves as expanding surface as the protector is hydraulically put on the transfer sleeve. New PB equipment is exceptionally light in weight—unloaded transfer sleeve for 4½" drill pipe weighs only 9¾ lbs.! This allows easy, quick handling by installation man.

PB
25 YEARS OF SERVICE TO THE OIL INDUSTRY

Patterson-Ballagh

Division of Byron Jackson Co.

MAIN OFFICE: 1900 East 65th Street
Los Angeles 1, California

Laurence Andrew has been appointed manager of the Pipe Line department of General Petroleum Corporation. Other department changes include the appointment of **V. C. Larsen** as general superintendent and **H. T. Williams** as Northern division superintendent at Taft., Calif. **C. W. House** has been named Southern division superintendent, Vernon, Calif.

Andrew has been with General Petroleum since December, 1912, and has spent the entire period in the Pipe Line department. His most recent post was general superintendent.

Larsen joined the company in 1919 as a truck driver. He transferred to pipe line maintenance work on General Petroleum's trans-mountain lines in 1929. Since 1940 he has held the post of Northern division manager and assistant general superintendent successively.

•

R. O. Wilson, Ponca City, Okla., and **G. R. Pate,** Fort Worth, have been promoted to general attorneys for Continental Oil Company. **Glenn L. Mace** and **Hugh W. Sanders** have joined Continental's legal staff at Fort Worth.

Here's Why
the C-34 Is Called the
WORLD'S MOST ROADABLE RIG!
Walker-Neer's specially designed tandem axle distributes all weight evenly, makes getting in and out of difficult locations much easier. The tandem assembly eliminates jar, provides extra safety at high road speeds. The C-34's compactness contributes immeasurably to accessibility of out of the way locations. Write today for full descriptive brochure giving all information.
WALKER-NEER MACHINE CO.
WICHITA FALLS, TEXAS

Hobart G. Mariner has been appointed superintendent of the Missouri division, Stanolind Pipe Line Company, succeeding **E. W. Young,** who has retired after 32 years of service with the company.

W. N. Stivers has been made superintendent of the Wyoming Salt Creek district, Stanolind Pipe Line Company, under area superintendent **R. R. Strand. S. L. Cox** will act as area engineer for the Nebraska and Wyoming divisions.

•

Stuart Cronin has been made division geologist for The Pure Oil Company in Tulsa. He was formerly division geologist at Billings, Mont., where he is succeeded by **Fred Devin,** formerly of Tulsa.

•

William L. Connelly, one of the most prominent and active oil men in the country, retired as chairman of the board of Sinclair Oil and Gas Company, Tulsa, after 58 years of continuous service in the oil industry. Connelly declared that he "is resigning, not retiring" and that he wanted to be relieved of some of his responsibilities and have time to do some things he wants to do.

Connelly entered the oil business at 19 as a drilling contractor and followed developments through Ohio, Indiana, Illinois and Kentucky. He moved to Independence, Kansas, in 1903 and became associated with Harry F. Sinclair in 1906 when he took charge of Sinclair's land and oil production in the Mid-Continent area. In 1912 he moved to Tulsa as an officer of the original Sinclair Oil and Gas Company and in 1916 became vice president of the Sinclair Cudahy Pipe Line Company. He assisted in the merger which resulted in the formation of the Sinclair Oil Corporation and in 1917 became president of the Freeport Mexican Oil Company and vice president of the Sinclair Mexican Oil Corporation with headquarters in Houston. In 1922 he moved to Casper, Wyo., and in 1926 was transferred to New York to become president of the Venezuelan Petroleum Company. He moved back to Tulsa in 1932 when the Sinclair Oil and Gas Company and Prairie Oil and Gas Company were merged, to become board chairman of the Sinclair Prairie Oil Company. With Connelly's resignation, the board chairmanship will be abolished. He will continue with the Sinclair organization in an advisory capacity.

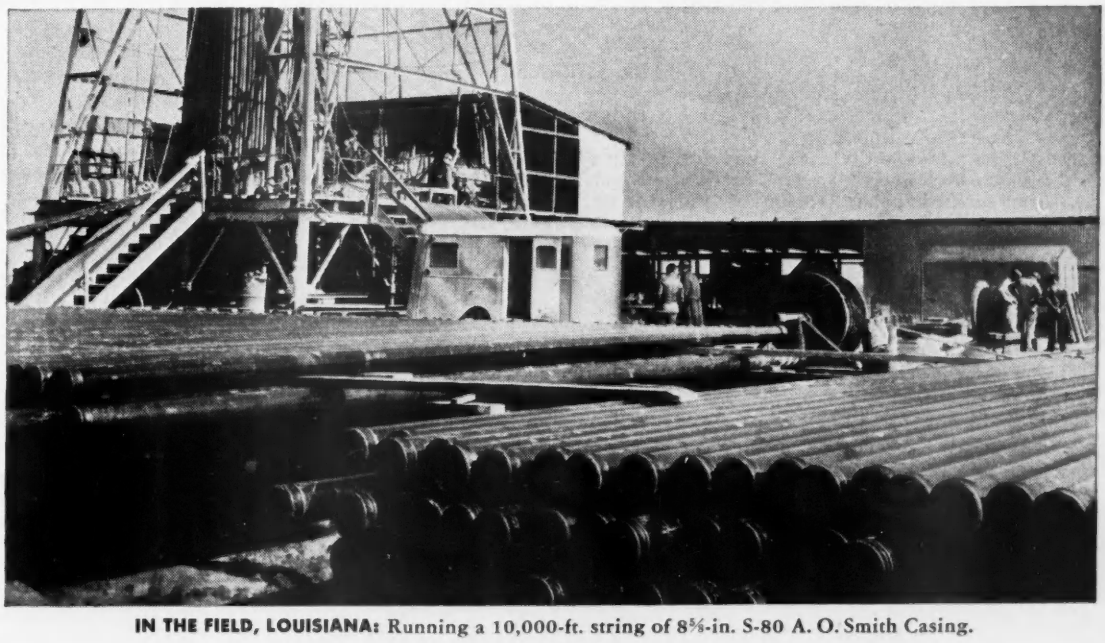
•

J. T. Watson, Jr., petroleum engineer graduate from the University of Texas, has joined the Illinois Mid-Continent Company at Mt. Carmel, Ill.

•

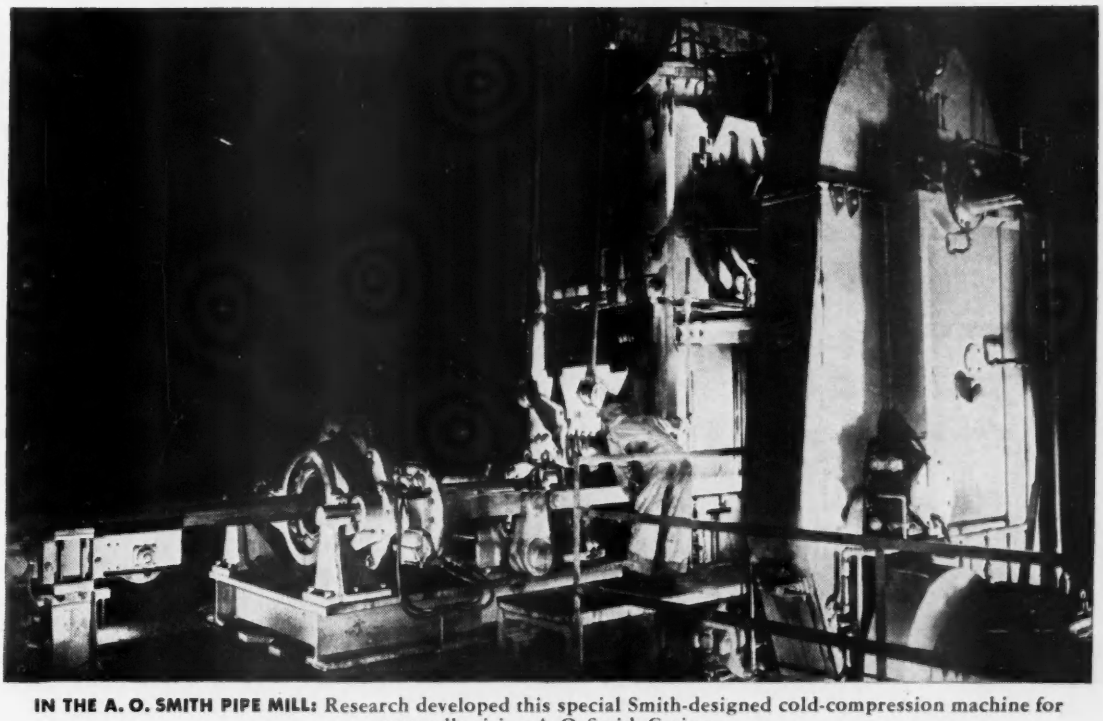
Bernard Podolsky has severed his connection with Robinson and Puckett at Olney, Ill., to become a consulting geologist at Fairfield, Ill.

DEPENDABILITY THROUGH



IN THE FIELD, LOUISIANA: Running a 10,000-ft. string of 8⅝-in. S-80 A. O. Smith Casing.

RESEARCH AND ENGINEERING



IN THE A. O. SMITH PIPE MILL: Research developed this special Smith-designed cold-compression machine for externally sizing A. O. Smith Casing.

A.O. Smith way 76th ANNIVERSARY 1874 - 1950

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CASING • LINE PIPE

A. O. Smith Corporation • New York 17 • Atlanta 3
Pittsburgh 19 • Chicago 4 • Houston 2 • Dallas 1
Seattle 1 • Tulsa 3 • Los Angeles 14 • International
Division: Milwaukee 1

Sam Johnson has been appointed geologist at the new district office at Albuquerque for Superior Oil Company of California.

•

C. L. Quillen has been named production foreman for The Carter Oil Company in the Cromwell area of the Greater Seminole field, Oklahoma. He succeeds **G. L. Osborne,** retired. **Leon Tustison** has been named chief accountant for Carter at Billings, Mont.

W. E. McCommons has joined the geological staff of **George S. Engle** at Evansville, Ind.

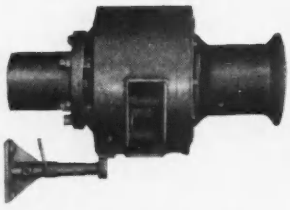
•

Rex Wilson is now construction engineer for Continental Oil Company at Billings, Mont.

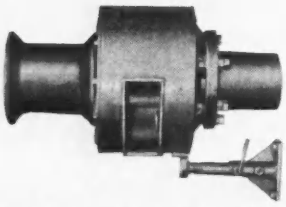
•

Kiron Munson has joined the Scouting department of The Carter Oil Company at Evansville, Ind.

FOSTER AIR MASTER BREAKOUT CATHEAD

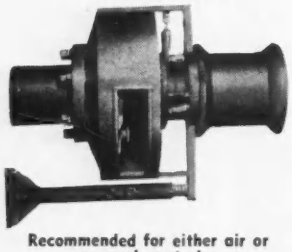


FOSTER AIR SPINNING CATHEAD



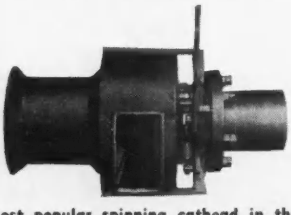
For your toughest cathead jobs. Both direct diaphragm operated.

FOSTER MASTER, TYPE B, BREAKOUT CATHEAD



Recommended for either air or manual controls.

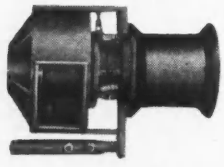
FOSTER SPINNING CATHEAD



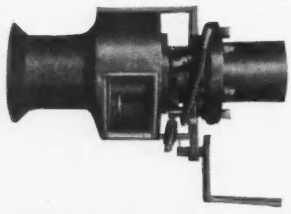
Most popular spinning cathead in the world. Recommended for manual controls.

We can't tell very much here about each of these new catheads, but they're the result of our best planning and engineering as specialists in manufacturing catheads since 1926. They're fully guaranteed. If you haven't already gotten the folders on them, better drop us a line today.

FOSTER MIDGET MASTER BREAKOUT CATHEAD



FOSTER MIDGET SPINNING CATHEAD



For cleanout rigs and shallow drilling; built on exact designs of the Master Type B, Breakout and of the Spinning Catheads, respectively.

Foster CATHEAD COMPANY
P. O. BOX 1675 WICHITA FALLS, TEXAS

Factory Representatives

Hopeman Equipment Company, Seminole, Oklahoma
Tillery & Parks, Odessa, Texas
R. D. Cloninger, Lafayette, Louisiana

L. L. Bechtel has retired as field superintendent in the Slaughter, Texas, area for Stanolind Oil and Gas Company after 30 years of service with the company.

•

Freeman Lomelino, president, **Allen Bickel,** vice president, and **Hubert A. Schien,** secretary, have organized the B-L-S Drilling Company, with headquarters at Olney, Ill.

•

Al Eron and **Earl Nance** have organized the Acme Drilling Company with headquarters at Grayville, Ill.

•

Warren L. Calvert, formerly in the Geological department, Ohio Fuel Supply Company, Oklahoma City, has become geologist for Tuley and Carter Drilling Company at Fairfield, Ill.

•

Roy Linden, manager of sales for Union Oil Company of California, has been elected a vice president.

•

William Moser, A. M. Poinsatte, H. H. Wesling and **H. E. Smith** have formed the National Drilling Company with headquarters at Mt. Carmel, Ill.

•

Art Holland has resigned as geologist-engineer for Fox and Fox in Oklahoma and Illinois and is now operating independently with headquarters in Fort Worth.

•

Harlan H. Yoakam, division geologist for the Plymouth Oil Company for the last seven years, has resigned to do consulting geology, with headquarters at the Hotel Sinton, Sinton, Texas.

•

W. H. McBrayer has assumed charge of Sinclair Oil and Gas Company's Legal department at Independence, Kansas, succeeding **T. J. Hanlon,** who has been granted a leave of absence.

•

Charles H. Hoke, formerly with Phillips Petroleum Company at Evansville, Ind., has been made chief geologist for C. H. Murphy Oil Company at El Dorado, Ark.

•

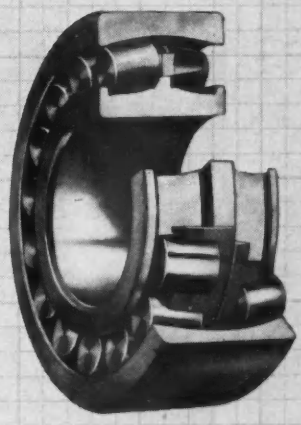
Al Pfeuffer, formerly with The Pure Oil Company at Reed City, Mich., has joined Sohio Petroleum Company as chief clerk at Owensboro, Ky.

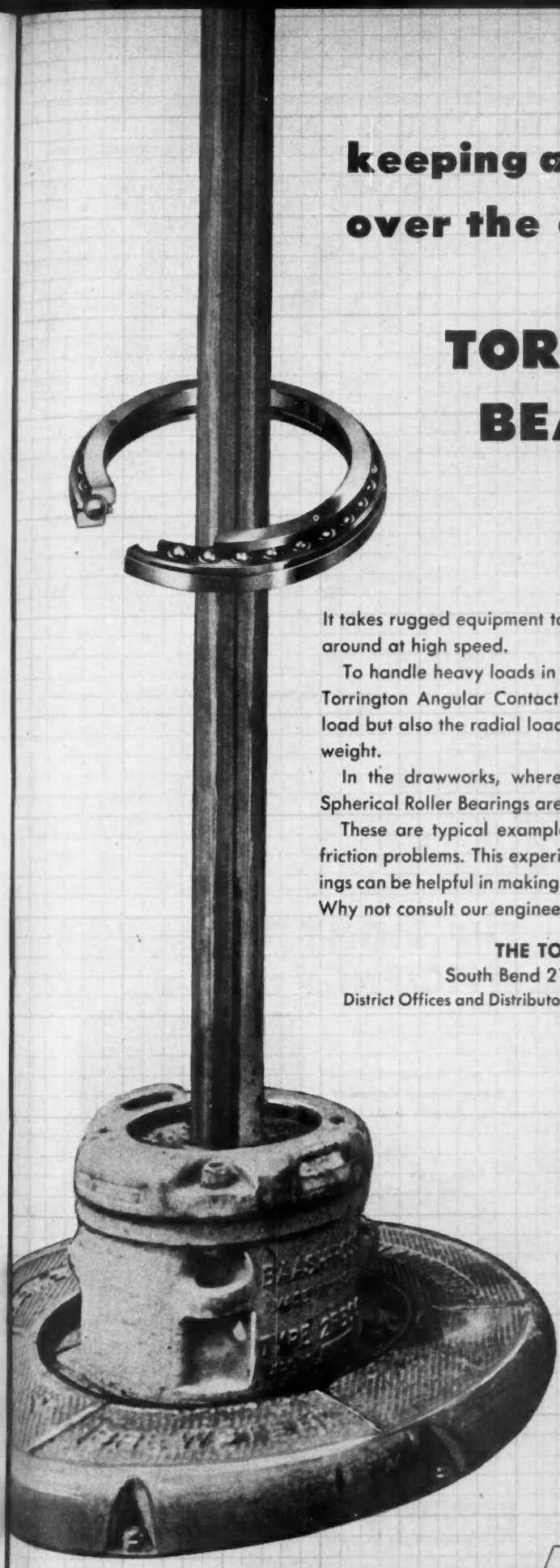
•

W. Preston Woodruff has resigned as tax attorney for Skelly Oil Company, Tulsa, to enter private practice and has been succeeded by **Richard Lunn.**

keeping a whip hand over the drill string...

TORRINGTON BEARINGS





It takes rugged equipment to control a mile and a half of drill pipe lashing around at high speed.

To handle heavy loads in rotary tables, The Brewster Company specifies Torrington Angular Contact Ball Bearings. They carry not only the thrust load but also the radial load imposed by the driving gear and unbalanced weight.

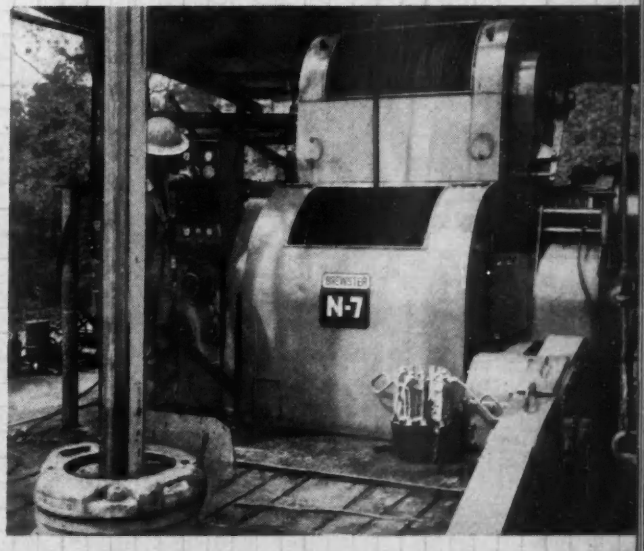
In the drawworks, where shafts are subject to deflection, Torrington Spherical Roller Bearings are used to insure smooth operation and long life.

These are typical examples of Torrington's ability to solve all kinds of friction problems. This experience with all major types of anti-friction bearings can be helpful in making your equipment give more dependable service. Why not consult our engineers on your next bearing application?

THE TORRINGTON COMPANY

South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada



TORRINGTON SPHERICAL ROLLER BEARINGS

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS

F. L. Fletcher, formerly in Talara, Peru, as toolpusher and assistant drilling superintendent for International Petroleum Company, Ltd., has moved to Ronan, Mont.

•

Jack Colle

Jack Colle has opened offices as consulting geologist and paleontologist at 1205 Kenwood, Houston. With the exception of the years spent in the armed forces, Colle was associated with **Hershal C. Ferguson** and was actively engaged in Gulf Coast geology and paleontology.

•

Jim Barfield has joined George and Wrather Drilling Company as geologist, and will be stationed at Mount Carmel, Ill.

•

Walter Willis has sold his interest in the firm of Calvert-Willis, Inc., Olney, Ill., and will operate as an independent. The firm name will not be changed and headquarters will be maintained at Olney.

Marlowe D. Melvin has joined Ryan Oil Company as geologist at Evansville, Ind. For ten years previously he had been geologist for The Carter Oil Company.

•

P. A. Wallace resigned as chief geologist for Stephens Petroleum Company and has opened an office in Oklahoma City to engage in consulting work with **Paul R. Traugh.**

•

Allison L. Hornbaker has been appointed geologist in charge of the Kansas State Geological Survey's Southeast Kansas office at Pittsburgh, Kansas. He succeeds the late **Dr. G. E. Abernathy.**

•

Tom W. Fenton, Jr., has been made a scout in the Ardmore, Okla., district, of Kerr-McGee Oil Industries, Inc. **John Isenberger,** also in the new Scouting department, will work out of the Oklahoma City headquarters.

•

R. V. Stephens, purchasing agent for the Public Service Company of Oklahoma, was named vice chairman in charge of the public utility group of the National Association of Purchasing Agents. He is a past president of the Tulsa association.

Ralph D. Chambers, formerly a geologist with Richfield Oil Corporation and Continental Oil Company, has been made manager of the Permian Basin district office of Vincent and Welch, Lake Charles, La., with **W. B. Kalhoefer,** also formerly with Richfield, as his assistant.

•

Max K. Watson, natural gas engineer with the Canadian River Gas Company for the past 20 years, has resigned and opened consulting offices at Amarillo, Texas.

•

Douglas Ball, petroleum engineer with experience in gas reservoir mechanics, gas production engineering, seimic exploration and pipe line operation, has become associated with **Max W. Ball,** oil and gas consultant of Washington, D. C.

•

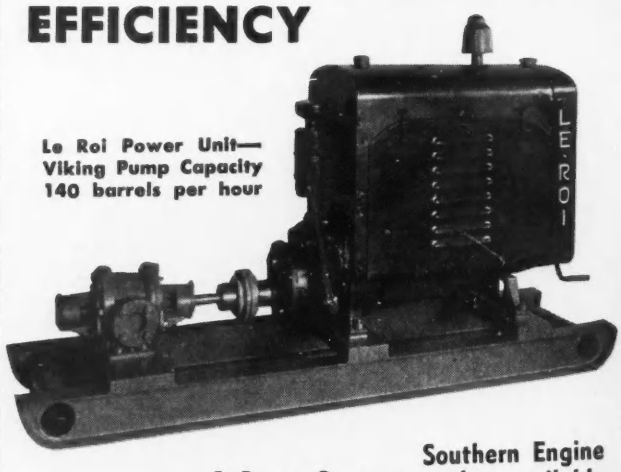
Frank Sonnenberg has joined Amerada Petroleum Corporation's geological staff at Billings, Mont.

•

Robert J. Lauder, Tulsa area safety representative, Shell Oil Company, has retired after 25 years of service with the company.

Kirby
Petroleum
Company

THE RIGHT TEAM FOR EFFICIENCY



Le Roi Power Unit—
Viking Pump Capacity
140 barrels per hour

Southern Engine & Pump Company makes available to you 40 years of "KNOW HOW" in your pumping requirements.

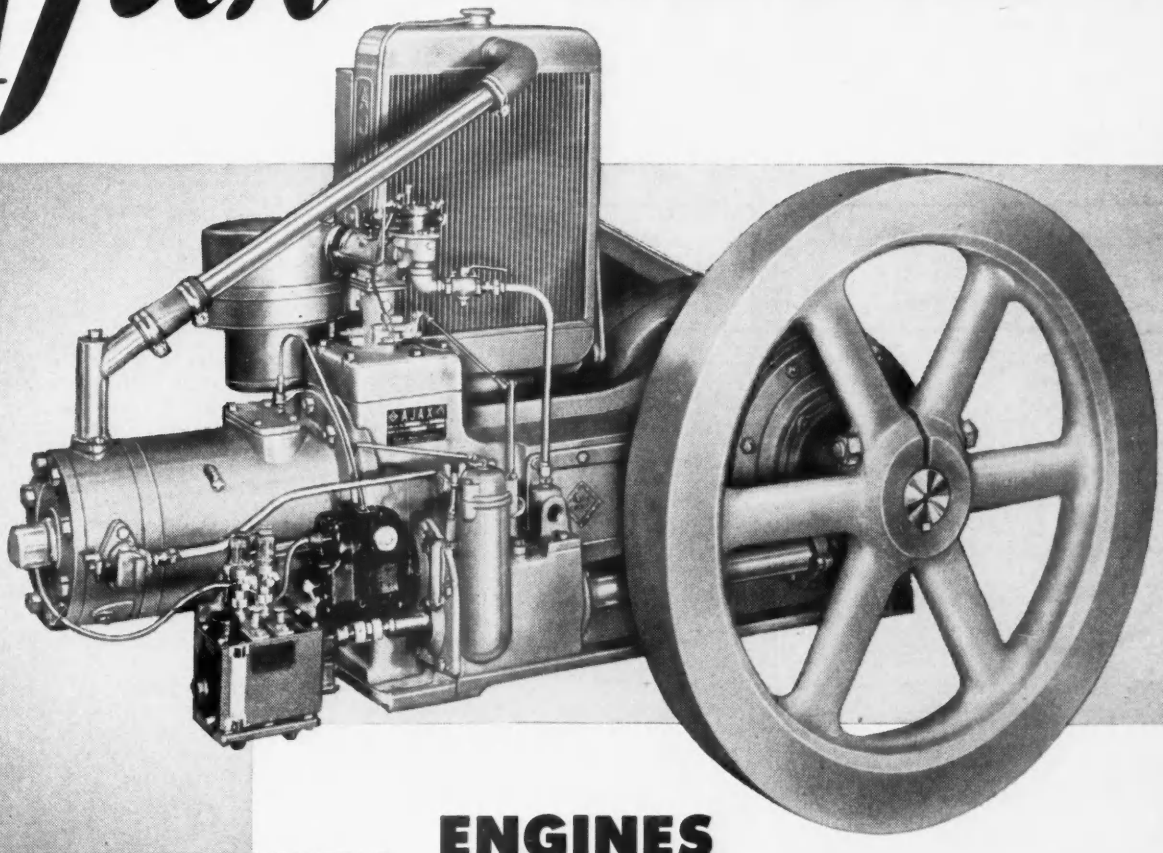
• Complete units and replacement parts at all branches.

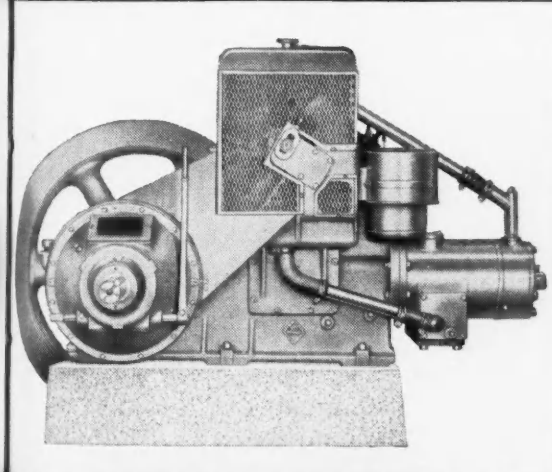
SOUTHERN
ENGINE & PUMP COMPANY

MANUFACTURERS • MACHINERY FACTORS • CONTRACTORS

Houston - Dallas - Kilgore - San Antonio
Edinburg, Texas; Houma and Lafayette, La.

Ajax GAS and OIL ENGINES





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When you need low-cost, foolproof engine performance for pumping and other continuous oilfield jobs—*pick AJAX!* Get down-to-earth AJAX reliability, with maintenance so low you never notice it. These engines *stay on the job* because that's what they're built for . . . see your Supply Man and have him show you the vital reasons-why!

AJAX ENGINES

AJAX IRON WORKS
CORRY, PENNSYLVANIA

Oil Field Distributors THE NATIONAL SUPPLY CO., TOLEDO, OHIO
R. B. MOORE SUPPLY CO., INC., BOLIVAR, N. Y. · BETHLEHEM SUPPLY CO., TULSA, OKLA.

H. R. (Red) Hammond, former managing editor of the Edmonton *Bulletin*, has joined Royalite Oil Company, Ltd., Calgary, Alberta, as assistant to S. F. Heard, president and managing director.

•

C. P. Bristol, chief exploitation engineer in Houston area for Shell Oil Company, has been promoted to area production manager. He succeeds **G. E. Burpee,** who has been transferred to Calgary, Alberta, Canada, in charge of Shell's production activities in Western Canada.

Harry H. Mack, Tulsa, long associated with Sunray Oil Corporation, has been named manager of production for the **Russell Maguire** interests in Kansas, Oklahoma, Mississippi and Texas, with headquarters at Wichita Falls, Texas. His assistant will be **H. E. Kline,** superintendent for Maguire interests.

•

Jack Small, formerly with Central Pipe Line Company, has joined the geological staff of Calvert and Willis, Inc., at Olney, Ill.

Roy J. Barnett, tax commissioner of Standard Oil Company (Indiana) has retired after 29 years' service.

Barnett joined Standard in 1920 after serving as a member of an accounting firm, and later with the income tax division of the U. S. Treasury department. He was the first comptroller of the Forest Preserve district of Cook County.

•

Robert B. Lewellyn has joined **L. A. Grelling,** independent, at Tyler, Texas, as scout.

•

Dorsey Hager, consulting geologist, has opened offices at 801 Continental Bank Building, Salt Lake City.

•

Ivan Collier, formerly with Petroleum Exploration Company at Lexington, Ky., has joined the Felmont Oil Corporation at Owensboro, Ky., as scout and landman.

•

Lloyd C. Blair, formerly with Builders, Inc., Wichita Kans., has joined Shell Oil Company's Personnel-Industrial Relations department at Tulsa.

•

Roger B. Jones has been appointed director of industrial relations for the Sinclair companies. Jones, who has for many years been connected with the Legal department, will headquarter in New York.

•

R. M. Carter, a former administrative assistant under **A. M. Hill,** superintendent of line maintenance, Stanolind Pipe Line Company, has been appointed superintendent of tankage, succeeding **C. E. Spencer,** resigned.

•

H. M. Horton, who has been in Venezuela and Colombia for Superior Oil Company of California, has resigned and opened offices at Mt Carmel, Ill., as an independent operator.

•

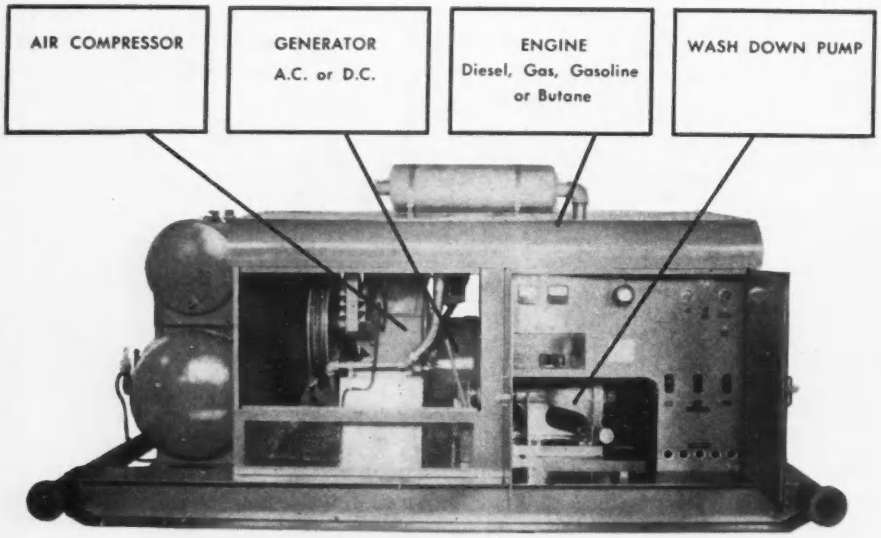
Claude C. Hildebrand has retired from the Scouting department, Phillips Petroleum Company, after 27 years of service in both the land and scouting departments.

•

W. C. Bednar has been made a partner in the firm of Meyer and Achtschin, Dallas consultants in petroleum geology, petroleum economics and petroleum engineering.

•

Fred T. Damon, formerly of Shawnee, Okla., has joined Big Chief Drilling Company, Oklahoma City, as geologist.



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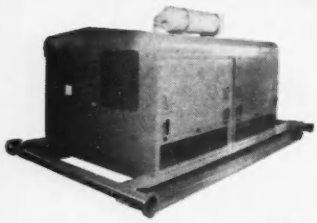

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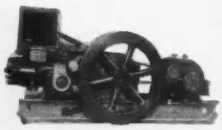
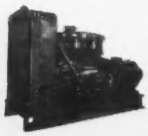
REINER DIESEL GENERATORS FOR ANY AUXILIARY SERVICE



These slow speed 2-cycle horizontal Diesel generators come in 10, 15, 20 and 25 KW sizes for D.C. or 50 and 60 cycle A.C. service.



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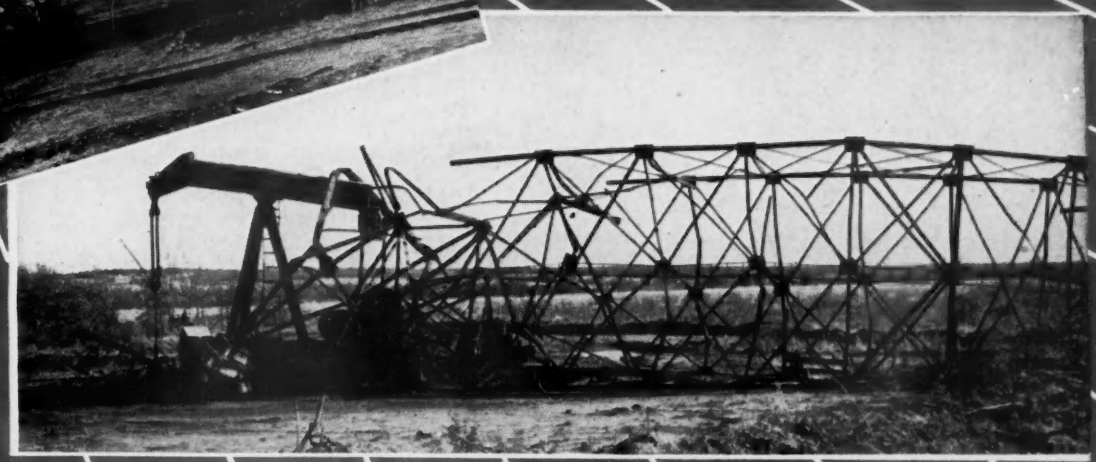

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ever interfere with the operation of a LUFKIN pumping unit. These compact, rugged nits carry on when weaker substructures and derricks topple with a crash.

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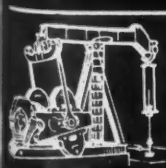
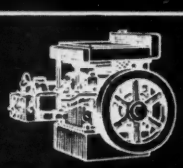
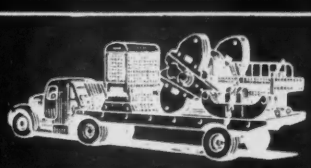


LUFKIN PUMPING UNITS



LUFKIN-COOPER-BESSEMER ENGINES



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INDUSTRIAL SPEED REDUCERS AND INCREASERS

DIVISION LUFKIN FOUNDRY & MACHINE COMPANY
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DEATHS

Roger W. Leason, 50, vice president and treasurer of Emsco Derrick & Equipment Company, died January 11 at Tarzana, Calif. Leason was a certified public accountant with Arthur Young & Company until he joined Emsco ten years ago. He was president of the Los Angeles Chapter of the Controllers Institute and was a member of API.

•

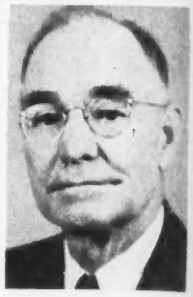
Harry C. Meyer, assistant general production superintendent of Signal Oil and Gas Company, died January 16 at Garden Grove, Calif. He joined Signal in 1936 after several years in production work in the Signal Hill area with Western Oil and Refining Company and others.

John L. Betts, 60, industrial relations executive of General Petroleum Corporation, died January 2 in Hollywood. Betts, who had been with General Petroleum 37 years, was supervisor of the Compensation division of the Industrial Relations department.

•

A. C. Neely, 53, assistant audit supervisor, Stanolind Pipe Line Company, Tulsa, died January 9. He had been with Stanolind 30 years.

David J. Rohrer, 76, vice president of The Four Wheel Drive Auto Company and a director of the company since its organization in 1910, died January 9 in Clintonville, Wis.



David J. Rohrer

Rohrer was elected the first treasurer of the company, and held that position until two years ago, when he was elected senior vice president. He was also president of the D. J. Rohrer Lumber Company, the D. J. R. Real Estate Company and the Atlas Conveyor Company.

•

Crawford M. Rosebrugh, chief engineer for Gulf Oil Corporation's Pipe Line department, died January 12 in Houston. He had been with Gulf since 1919. He designed the Mene Grande pipe line system in Venezuela, and was active in development of the Kuwait Oil Company pipe line system in the Middle East.

•

James McIntyre, 77, retired former editor of the *Oil and Gas Journal,* died January 31, in Tulsa. He entered the oil business as a messenger for the Bradford Oil Exchange, Bradford, Penn. Later he became a newspaperman, and resigned in 1917 as managing editor of the Bradford Star Record to go to Tulsa where he became Oklahoma and Kansas field representative for the *Oil and Gas Journal.* He was made editor in 1921 and held that position until 1933 when he became consulting editor. He retired in 1940.

•

Julian Q. Myers, retired district geologist at San Antonio for Shell Oil Company, died January 5. He was chief geologist for Sinclair Oil and gas Company, Tulsa, from 1919 to 1926.

•

Joel C. Ott, 47, Humble Oil & Refining Company superintendent at Beaumont, Texas, died January 2.

•

R. L. Agee, district manager of A-1 Bit & Tool Company, Corpus Christi, died January 5.

•

Frank Horton, 96, retired oil well drilling and casing pulling contractor, died January 29 in Tulsa.

•

J. Axel Jacobson, 71, retired Titusville, Penn., oil operator, died January 27 in Tulsa.

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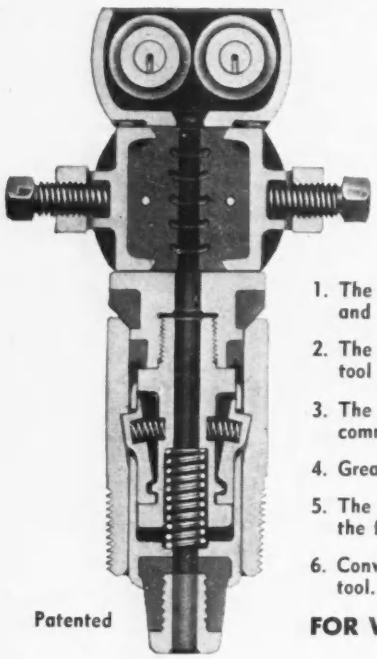
LOW COST—LONG LIFE



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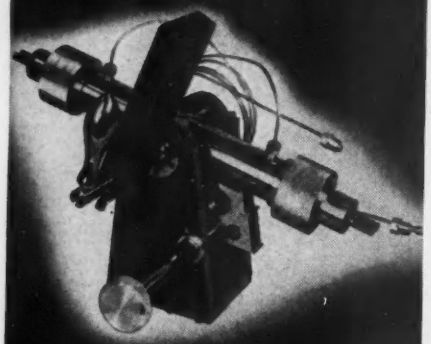

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Associations

LOS ANGELES NOMADS OFFICERS for 1950 are, left to right, first row, Fred Ripley, International Derrick & Equipment Company, regent; Herm Paschall, H. C. Smith Oil Tools, assistant secretary; Earle Boggess, Baker Oil Tools, Inc., president; Ted Forsyth, Emsco Derrick & Equipment Company, vice president, and Knight Templeton, Champion-Smith, Inc., treasurer. Second row, Lee Laird, Gil-Lair Products, Inc., regent; James Hughes, Lane-Wells Company, deputy sergeant-at-arms; Jack Ballagh, Extruders, Inc., secretary; John Flanagan, M. O. Johnston Oil Field Service, assistant treasurer, and Jerry Engstrand, Grant Oil Tools, sergeant-at-arms.

Salvatori Is Club President

Henry Salvatori, Western Geophysical Company, is the new president of Petroleum Club of Los Angeles. Other officers include Frank A. Morgan, Richfield Oil Corporation, vice president; James G. Leovy, Western Gulf Oil Company, secretary; and Howard C. Pyle, Continental Consolidated Corporation, treasurer.

New directors of the club are P. S. Magruder, General Petroleum Corporation; E. Fred Davis, consultant; and Rollin Eckis, Richfield.

Oil Progress Week Set for October

The National Oil Industry Information Committee has set the third week in October as the date for Oil Progress Week this year and also in 1951. Oil men use this seven-day period to report directly to their communities on the progress and achievements of the industry.

Guy Tate, vice president of Magnolia Petroleum Company, Dallas, was elected a vice chairman of OIIC.

North Texas AAODC Elects

George W. Graham, T. G. & M. Drilling Company, was elected chairman of the North Texas chapter of the AAODC at a meeting held in Wichita Falls. He succeeds E. B. Clark, E. B. Clark Drilling Company.

Frank Harvey, Harvey Brothers Drilling Company, was elected vice chairman, succeeding R. Clay Underwood, Underwood Drilling Company. Phil Bolin, D. H. Bolin & Sons, was named secretary, succeeding Dee Ford, Moran Brothers, Inc.

AGA Chooses 1950 Officers

Hugh H. Cuthrell, vice president of The Brooklyn Union Gas Company, Brooklyn, N. Y., has been elected president of the American Gas Association for 1949-1950. First vice president is D. A. Hulcy, president, Lone Star Gas Company, Dallas; second vice president, George F. Mitchell, president, The Peoples Gas Light & Coke Company, Chicago; and treasurer, Edward F. Barrett, president of Long Island Lighting Company, Mineola, N. Y.

Duncan API Chapter Formed

W. D. Owsley, Halliburton Oil Well Cementing Company, Duncan, Okla., was elected chairman of the new Southwestern Oklahoma API chapter at Duncan. Others elected are J. R. Puckett, Magnolia Petroleum Company, Duncan, vice chairman for programs; W. C. Merrell, Duncan Truck & Farm Machinery Company, vice chairman for publicity and public information; Guy Tucker, Continental Supply Company, Duncan, vice chairman for membership; Charles R. Miller, Jr., Schlumberger Well Surveying Corporation, Duncan, secretary-treasurer.

Southern California AIME Elects

N. van Wingen, vice president of Petroleum Technologists, Inc., was elected chairman of the Petroleum branch of the American Institute of Mining and Metallurgical Engineers, Southern California Section, at the Fall Meeting in Los Angeles. F. L. Wadsworth of General Petroleum Corporation and Ray A. Hancock of Lane-Wells Company, were elected vice chairmen.

Committee Chooses McMillan

G. F. McMillan, district manager, Gulf Oil Corporation, Denver, succeeded Paul Hirth, Continental Oil Company, as chairman of the Rocky Mountain Oil Industry Information Committee.

Unsell Heads IPAA Publicity

Lloyd N. Unsell has assumed charge of Independent Petroleum Association of America's information service handling press and radio relations. He was formerly editor of *Independent Monthly*, IPAA's official publication, and is succeeded by Tom Tripp, Jr.

AIME Names van Wingen

N. van Wingen, vice president of Petroleum Technologists, Inc., Montebello, Calif., has been elected chairman of the Pacific Petroleum Chapter, AIME.

LP-Gas Meet Set in Chicago

Liquefied Petroleum Gas Association's four-day convention and trade show will be staged at the Palmer House, Chicago, May 8-11. W. A. Schuette, Hausgas, Inc., Washington, Mo., is chairman of arrangements.

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Yes, over 15 million feet of hole surveyed, equivalent to the distance between San Francisco and New York . . . a record of which Eastman can boast.

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5. Locate sub-surface zones which may be sliding.
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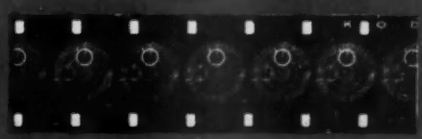

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HOUSTON, W. A. Swink, Phone Wydown 9-2858
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ASSOCIATIONS

Pacific API Will Meet May 11-12

The spring meeting of the Pacific Coast district, API Division of Production, will be held May 11-12 at the Biltmore Hotel, Los Angeles. E. C. Babson, Union Oil Company of California, Whittier, Calif., is general chairman of the spring meeting committees, and M. B. Standing, General Research Corporation, La Habra, Calif., is chairman of the Pacific Coast district offices.

Alcorn Is Penn Grade Treasurer

F. W. Alcorn, treasurer of the Pennzoil Company, has been named assistant treasurer of the Pennsylvania Grade Crude Oil Association.

Rankin Heads Financial Committee

R. G. Rankin, The Texas Company, New York, has been named general chairman of the API Financial and Accounting Committee. General vice chairman is J. R. Mulvey, Humble Oil & Refining Company, Houston. The committee is comprised of 137 oil men.

Bodman Elected by Auditors

G. T. Bodman, assistant controller, Continental Oil Company, Ponca City, Okla., has been elected regional vice president of the Institute of Internal Auditors.

API Names Harbison

Max Harbison, assistant division superintendent, Kewanee Oil Company, was elected chairman of the Panhandle Chapter, API. Fred Neslage, West Pampa Repressuring Association and Leo Frye, Stanolind Oil and Gas Company, were named vice chairmen, and Clayton Husted, Pampa, secretary-treasurer.

Permian Basin Geophysicists Elect

Lorenz Shock, National Geophysical Company, was elected president of the newly organized Permian Basin Geophysical Society. Other officers are C. W. Payne, The Pure Oil Company, first vice president; J. B. Worley, Strawn Merchandise Company, second vice president; W. L. Homan, Republic Exploration Company, secretary; E. L. Mount, Continental Oil Company, treasurer.

The group plans to request affiliation with the National Society of Exploration Geophysicists.

Wyoming Geologists Choose Berry

George Berry, Sun Oil Company, was elected president of the Wyoming Geological Association, Casper, Wyo. Other officers are J. H. McCoy, Sinclair Oil and Gas Company, first vice president; Klass Van Der Weg, General Petroleum Corporation, second vice president; Allan Cree, Cities Service Company, treasurer; and R. W. Mallory, Stanolind Oil and Gas Company, secretary.

Midwest Power Conference Planned

"Economy in Power" will be the theme of principle sessions of the twelfth annual Midwest Power Conference, April 5-7, Sherman Hotel, Chicago.

Roland A. Bedenholzer is director of the conference which is sponsored by the Illinois Institute of Technology with the cooperation of 18 midwestern universities and professional societies.

Gas Technology Course Scheduled

Fifth Annual Short Course on Gas Technology will be held on the campus of Texas College of Arts and Industries May 29-31. In addition to a general session, sections will be presented on Problems of Production and Transmission and on Improved Techniques in the Utilization of Natural Gas.

Tulsa Pipe Liners Elect

The Pipe Liners Club of Tulsa elected the following officers for the coming year: P. L. Reichard, Gulf Refining Company, president; J. Delbert Jones, Gulf Refining Company, vice president; F. C. Whiteside, Interstate Pipe Line Company, secretary; G. G. Billings, Shell Oil Company, treasurer. New directors include T. F. Williamson, Jr., T. D. Williamson, Inc., and Joe L. Cahill, Continental Oil Company.

AGA Schedules Conventions

The 1951 Annual Convention of the American Gas Association will be held in St. Louis, October 15-18. The gas industry's convention for 1950 is scheduled for Atlantic City, October 2-6.

Research Director Is Chosen

The board of directors of the Colorado School of Mines Research Foundation, Inc., has appointed Vernon L. Mattson director of the foundation.

Kinderman Will Head SAIE

Walter Kinderman of Phillips Petroleum Company, Bartlesville, Okla., has been elected 1950 president of the Society of Associated Industrial Editors. He succeeds Walter Beach of Humble Oil & Refining Company, Houston.

Mines Bureau Chief Named

J. Bruce Clemmer, mineral technologist and administrator for the U. S. Bureau of Mines, has been named director of Region 7 of the Bureau with headquarters at Tuscaloosa, Ala.

Standco NO-SMOKE

STANDCO BRAKE LINING

Is the driller's best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims. See pages 3608-3613, Composite Catalog.

Standco Brake Lining Co.
HOUSTON

HOUSTON LABORATORIES
Analytical and Consulting Chemists
Podbielniak Gas Analyses, Oil Field Brines, Waters, Cores, Muds, etc. Reservoir equilibria studies for crude and condensate wells.
LD 267—Box 132 Houston, Texas

OIC UNION BONNET BRONZE GATE VALVE

GIVES YOU MONEY-SAVING FEATURES YOU'LL WELCOME

This series of OIC valves (Figure nos. 7200, 7202 and 7208) is rated for working pressures of 200 pounds steam at 550°F. — 400 pounds water, oil and gas, non-shock. Union bonnet screwed-end type. Solid wedge rising stem, double-disc rising stem and solid wedge non-rising stem designs. Tapered seats and wedges of OIC copper nickel alloy. You'll find this new valve a money-saver on water, oil, gas, steam or any other service where bronze gate valves are used.

LONGER LIFE—LOWER COST

Scientifically designed, constructed of highest quality materials, accurately machined and thoroughly tested for trouble-free operation.

EASILY SERVICED—LOWER MAINTENANCE

Easy to dismantle and reassemble. Quick inspection and servicing. Easy repacking.

EASIER OPERATION—SAVES TIME

Perfect seating without binding or undue wear. Straight-through flow. Minimum pressure drop.

STRONGER—GREATER SAFETY

Ample wall thicknesses. No dangerous stress concentrations. Leak-proof joints.

OIC
PACE SETTER IN VALVES

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SPECIAL INTRODUCTORY OFFER

If you'd like to check this OIC bronze 200 lb. union bonnet gate valve, simply send us the size and we'll deliver you a sample on memo billing. Inspect it, analyze it, take it apart, test it. At the end of 30 days, if you're not convinced of its superiority over any comparable valve you've ever used, return it for full credit.

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172 S. LYMAN ST. WADSWORTH, OHIO

BRONZE • IRON • CAST STEEL • FORGED STEEL

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COMPOUNDS
MONEY BACK GUARANTEE

KANT-GALL TOOL JOINT COMPOUND
EXCLUSIVE 500-TON SPECIAL
LONG-LIFE DRILL COLLAR COMPOUND

Here's real thread protection against galling and washouts! Each one is engineered to do certain jobs best. That's why you can always break the joint when you use Jimmie Gray Compounds!

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PETROLEUM ENGINEERS
CABLE & STINE
WICHITA FALLS, TEXAS

EXPERIENCED PRACTICAL AND TECHNICAL CONSULTING PRODUCTION ENGINEERING SERVICE

•

SPECIALIZING in MODERN SECONDARY RECOVERY

ASSOCIATIONS

NEWLY-ELECTED OFFICERS of the Gulf Coast Section, Petroleum Branch, AIME, include, left the right, front row, E. L. Petre, Gulf Oil Corporation, 1950 chairman; A. B. Stevens, vice chairman for Texas A. & M. College. Back row, left to right: E. B. Miller, Tide Water Associated Oil Company, director; E. R. Rassinier, Phillips Petroleum Company, director; A. G. Gueymard, City National Bank, secretary-treasurer; and J. E. Kastrop, WORLD OIL, section delegate to the national organization. Other officers are G. D. Robertson, Shell Oil Company, vice chairman; Dr. George Fancher, vice chairman for The University of Texas; Owen Thornton, The Texas Company, 1949 chairman and newly-elected director; and L. V. Uhrig, Humble Oil & Refining Company, director.

API Production Group to Meet

The Eastern district, Division of Production, API, will hold its spring meeting in Cleveland, April 26-28. R. W. French, vice president of Sohio Petroleum Company, Cleveland, is chairman of the general arrangements committee.

Dallas-Fort Worth Nomads Elect

A. J. Olson, chief engineer for Continental Supply Company, Dallas, has been elected president of the Dallas-Fort Worth Chapter of Nomads. Other officers are K. W. Davis, president of Mid-Continent Supply Company, Fort Worth, vice president; E. F. Shiels, sales engineer, International Derrick & Equipment Company, secretary; Ed Whetzle, sales manager for *Drilling* magazine, treasurer; R. E. Todd, diamond bit specialist, Core Laboratories, Inc., assistant treasurer; J. E. Everroad, president, Cummins Sales & Service, Inc., sergeant-at-arms; and Jim Bridges, Buda Sales & Service, assistant sergeant-at-arms. Regents are Brad Mills and J. C. Basecheart.

TIPRO Meeting to Be in Dallas

Texas Independent Producers and Royalty Owners will hold its fourth annual meeting March 9 in Dallas, with headquarters at the Baker Hotel.

Members of the five standing committees will meet Wednesday, March 8. The morning business session March 9 will begin at 9:30, with the luncheon at noon. A separate luncheon and style show is planned for the ladies. At 2 p.m. the afternoon business session begins, followed at 5:30 with a cocktail party. The dinner will begin at 7 p.m.

Oklahoma Utilities Group Elects

Officers of the Oklahoma Utilities Association for 1950 are D. W. Reeves, general sales manager, Oklahoma Natural Gas Company, Tulsa, president; C. N. Robinson, vice president, Public Service Corporation of Oklahoma, Tulsa, first vice president; Richard W. Camp, vice president, Consolidated Gas Utilities Corporation, Oklahoma City, second vice president; H. H. Ferrin, treasurer, Oklahoma Gas and Electric Company, Oklahoma City, treasurer; Miss Kate A. Niblack, Oklahoma City, secretary.

Directors (three-year term) are L. A. Farmer, president, Northern Oklahoma Gas Company, Ponca City; C. B. Day, general manager, Consolidated, Oklahoma City; (one-year term) Malcolm Morrison, assistant to the president, Oklahoma Gas and Electric; D. J. Tuepker, director Public Affairs department, Public Service; A. F. Potter, district manager, The Gas Service Company, Bartlesville; Reeves; W. R. Thomas, Oklahoma manager, Southwest Natural Gas Company, Ada; (hold-over) R. K. Lane, president, Public Service; E. C. Joullian, president, Westoc Oil and Gas Company, Oklahoma City; D. S. Kennedy, president, Oklahoma Gas and Electric; and J. Y. Wheeler, Ardmore, Okla.

Vanderwilt Is Mines President

Dr. John W. Vanderwilt, Denver consulting geologist, has been named president of the Colorado School of Mines to succeed Dr. Ben H. Parker, resigned.

John W. Vanderwilt

Vanderwilt is a former member of the faculty of Colorado School of Mines as well as the University of Colorado. He received his master's degree from the University of Michigan, and his Ph.D. from Harvard University. He has been a consulting geologist for Climax Molybdenum Company and also served on the board of experts of the Bureau of Reclamation.

API to Keep Present Locations

The American Petroleum Institute has decided to keep its headquarters in New York City and its division and branch offices, with one exception, in their present city locations. The exception is the branch office of the Department of Safety, now in Washington, which will be moved to the main headquarters in New York.

API Executive Committee will meet April 3 and 4 in Houston.

Small Skid Units...

FRED E. COOPER
TULSA
HOUSTON · ODESSA · LOS ANGELES
DRAW WORKS
SPUDDERS
WINCHES
POWER UNITS
A-C

Model W-201 SKID WINCHES

SERVICING TO 3000 FT.

These light weight units are of extremely rugged construction. Their economy is outstanding. On most jobs no more than 4 gals. of fuel required to pull and rerun rods and tubing. They can be mounted on small trucks which makes for low total investment. They are ideal for water well drilling draw works. Many of them are being used by major contractors. Built in single or double drum, can be equipped with Rotary Drive, Jerk Line Spudder and Telescoping Mast.

Brakes — Two — 26" dia. x 5" wide, self-energizing
Drum Capacity — 3300' of ⅝" line
Line Speeds — 8 from 52' to 866' p.m.
Maximum Line Pull — 16,750 lbs. at 52' p.m.

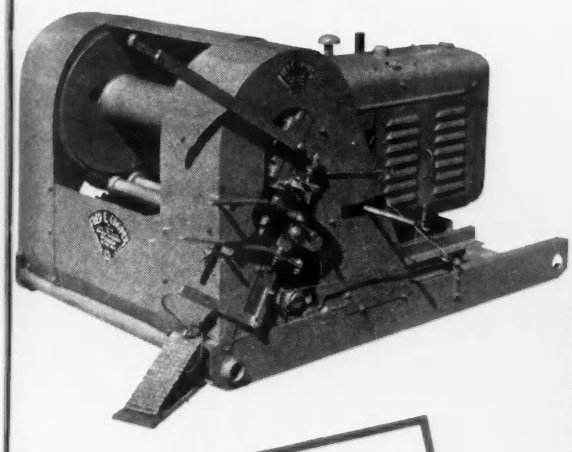
Model B-125 SKID WINCHES

For Shallow Production — to 1500'

Compact and light. Can be hauled in a ¾ ton pick-up truck. So low in cost that producers of marginal leases can well afford to buy this new modern factory-built equipment — costs less to buy and operate than second hand pulling machines. Nothing has been spared in the building of these small units to give them the same rugged quality that has made Cooper - A C Winches so popular for the past thirty years.

Powered by A-C Model B-125 Power Unit with heavy duty A-C Model B Tractor Transmission. All steel winch construction. Drum and Power Shafts mounted on ball bearings.

Line Capacity — 1600' of 9/16"
Brakes — Two — 20" dia. x 4" wide
Line Speeds — 6 from 53' to 700' p.m.
Maximum Line Pull — 11,230 lbs. at 53' p.m.



It's the only line of well servicing equipment built from the ground up by one manufacturer and serviced throughout the world by the same organization.

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P. O. Box 1890 TULSA, OKLA.

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If you use pipe—
you need—

RECTORSEAL #1

• INSOLUBLE IN OIL AND WATER

Rectorseal #1 is the perfect sealant for use on: (1) Drilling Rigs (2) Well Completions (3) Production Lines (4) In Refineries (5) Distribution Systems. Everywhere in the Oil Industry for the past 13 years Rectorseal #1 has proved its superiority as a perfect sealant in maintaining "leak-free," "trouble-free," "cost-free" connections. It's designed especially for the Oil Industry.

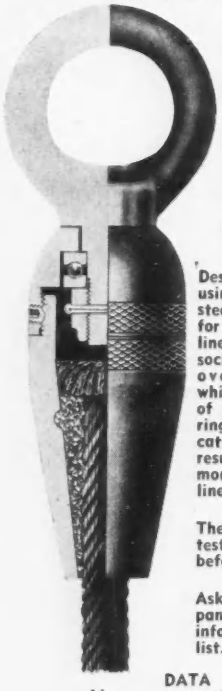
Ask your supply store or write—

RECTORSEAL, Dept. G, 2215 Commerce St., Houston, Texas.

Export: Champion & Smith, Inc., 617 S. Olive St., Los Angeles, Calif.; 10 Rockefeller Plaza, New York, N. Y.,

RECTORSEAL
Manufactured by
RECTOR WELL EQUIPMENT CO., INC.
Fort Worth, Texas
MAKING THE OIL INDUSTRY SAFER

For More Economical and Safer Cat Lines Use . . .



L-K Ball Bearing Wire Line Cat Line SWIVELS

Designed for use in using wire lines instead of manila rope for cat lines. Wire line is babbitted in socket end for use over the derrick while sufficient length of manila is used in ring end for use with cat head winch. This results in a safer and more economical cat line.

These swivels are all tested to 10,000 lbs. before being shipped.

Ask your Supply Company or write for full information and price list.

	DATA			
	Line Size Up to	Weight Lbs.	Over-All Length, Inches	Breaking Strength, Lbs.
105	1¾"	4⅛	8⅛	40,000
105-A	1¾"	4¼	8⅛	40,000
106	1¾"	5¼	8½	60,000

L-K
Pump Valve Company
P. O. Box 901 Houston, Texas

ASSOCIATIONS

MEMBERSHIP IN THE LIFE MEMBER CLAN of the Kansas-Oklahoma division of the Mid-Continent Oil and Gas Association was conferred on William F. Semple, retired general counsel for Deep Rock Oil Corporation and Edwin Reeser, retired president of Barnsdall Oil Company, for outstanding services to the industry. The presentation was made by Conger Reynolds, director of public relations, Standard Oil Company of Indiana, at the Association's annual meeting in Tulsa. In the picture, left to right, are W. T. Payne, president, Big Chief Drilling Company, Oklahoma City, president of the division; Semple, Reynolds and Reeser.

New York Nomads Choose Officers

Henry J. McAdams has been elected president of the New York Chapter of Nomads. Other officers elected to serve in 1950 are Howard B. Book, vice president; E. T. Landgraff, secretary; Fred J. Jobst, assistant secretary; Maurice F. Delano, treasurer; John D. Evans, assistant treasurer; Kenneth D. Demarest, sergeant-at-arms; Eugene R. Smoley, assistant sergeant-at-arms. Regents are Val R. Wittich, Jr. and Russell D. Heath.

Cline Is Elected AAODC Chairman

W. W. (Bill) Cline, San Joaquin Drilling Company, was elected chairman of the California Chapter, American Association of Oil Well Drilling Contractors. Other officers are A. H. (Ham) Bell, Bell & Burden, vice chairman for Los Angeles Basin; Harvey Davis, Crown Drilling Company, vice chairman for San Joaquin Valley; and Lee Daniel, Loffland Brothers, who was re-elected secretary.

Public Relations Head Named

Carroll A. Lake has been named executive and public relations director for the Rocky Mountain Oil and Gas Association.

Oklahoma City Scouts Elect

The following will serve as officers during 1950 of the Oklahoma City Scouts and Landmen's Association: John W. Allen, The British-American Oil Producing Company, president; Robert W. Bayliss, Amerada Petroleum Corporation, first vice president; Shelby Alexander, Magnolia Petroleum Company, second vice president; Kent V. Morrison, Atlantic Refining Company, Shawnee, Okla., secretary-treasurer; John B. Carey, Continental Oil Company, editor.

ECA Names George Walden

George S. Walden, former chairman of the board and chief executive officer of the Standard-Vacuum Oil Company, has assumed duties as head of the petroleum unit in the Office of the Special Representative in Paris, the Economic Cooperation Administration announced.

Walden was with Standard-Vacuum from 1934 to 1946 when he retired. During that period he was on leave for duty with the State Department from 1942 to 1944. He was stationed in London as petroleum attache, and as a special representative of PAW.

South Texas Geologists Elect

Douglas Weatherston, consulting geologist, San Antonio, was elected president of the South Texas Geological Society for 1950. John R. Sandidge, Magnolia Petroleum Company, is vice president; Keith L. Rathbun, Continental Oil Company, secretary; and Tom S. Gandy, W. C. McBride, Inc., treasurer.

Members of the Executive Committee are Paul B. Hinyard, Shell Oil Company, and Walter J. Boyle, consultant.

Lewis Heads Tri-States AAODC

Will I. Lewis, Sr., Mt. Vernon, Ill., was elected chairman of the Tri-States Chapter of American Association of Oilwell Drilling Contractors for 1950. He succeeds Ira Van Tuyl, V-T Drilling Company, Evansville, Ind., who was elected vice president for Illinois, Michigan, Indiana and Kentucky at the Ninth Annual Meeting of AAODC in Dallas.

FPC Vice Chairman Named

Mon C. Wallgren has been elected vice chairman of the Federal Power Commission to serve during 1950. He succeeds Commissioner Claude L. Draper. Wallgren has been a member of the Commission since November 2.

Houston Industrial Show Planned

The first annual Houston Industrial Exposition, featuring exhibits showing major industrial developments of the past ten years, will be held in Houston's Sam Houston Coliseum May 10-14.

Ed Lenzner, general manager of the show, formerly managed the oil expositions in Houston in the 1930's.

Wichita Falls Landmen Elect

H. P. Hodge, Magnolia Petroleum Company, has been elected president of the Wichita Falls Landmen's Association, with Martin E. Hooten, The Superior Oil Company, and J. Gregg Lowe, Jr., Humble Oil & Refining Company, vice president and secretary, respectively.

Kansas Geologists Elect

New officers of the Kansas Geological Society are Frank M. Brooks, director and manager of land, geology and production, El Dorado Refining Company, El Dorado, president; Joseph R. Clair, Great Lakes Carbon Corporation, vice president; Ralph Ruwwe, Stanolind Oil & Gas Company, secretary-treasurer; and Don Allen, Westgate-Greenland Oil Company, director.

Pacific AAPG Elects Officers

New officers for the Pacific Section, American Association of Petroleum Geologists are J. R. Pemberton, consultant, president; Arthur S. Huey, Hancock Oil Company of California, vice president; and Milton Lewis, consultant, secretary-treasurer.

Southern GEOPHYSICAL COMPANY

PRECISION SEISMIC SURVEYS

REFLECTION

REFRACTION

•

DATA REANALYSIS

•

SOUTHERN GEOPHYSICAL COMPANY

PAUL H. LEDYARD — SIDON HARRIS, PRESIDENT — R. H. DANA

FORT WORTH, TEXAS

EQUIPMENT AND SERVICE SUPPLIERS' NOTES

Rockwell Names Atlanta Manager

Rockwell Manufacturing Company has appointed J. W. Northcutt as Atlanta district sales manager to succeed C. C. Moore who has been transferred to manage the new district office in Columbus, Ga.

J. W. Northcutt

Northcutt, a mechanical engineer graduate of Oklahoma A. & M. College, joined the Tulsa district office in 1936 as sales engineer in the Corpus Christi area. Prior to his present assignment, Northcutt handled all major oil and engineering accounts in the Houston district.

Moore, a graduate engineer of Washington and Lee University, became Atlanta district manager in 1943.

Welex Announces Expansion Plan

Welex Jet Services, Inc., Fort Worth, inaugurated a new program of expansion, offering the first of 21,040 new shares of no par value common stock to present stockholders by means of subscription warrants. The new issue is also being offered for public sales by Laird and Company, underwriter, Wilmington, Dela.

The firm was incorporated in 1945 to develop a new method of oil well casing perforating and shooting. The result, shaped charge jet perforating, is now licensed to seven oil well service companies: Byron Jackson Company, Dowell Incorporated, International Cementers, Inc., Lane-Wells Company, Perforating Guns Atlas Corporation, Spartan Tool and Service Company, and the Western Company.

Steel Firm President Named

Clifford F. Hood, president of American Steel and Wire Company, Cleveland, a U. S. Steel subsidiary, has been elected president of Carnegie-Illinois Steel Corporation, Pittsburgh, another subsidiary of U. S. Steel.

Hood succeeds Charles R. Cox, who resigned to become president of Kennecott Copper Corporation, New York. Cox succeeds the late E. T. Stannard.

Harvey B. Jordan, vice president in charge of operations of American Steel and Wire Company, has been elected president of the company.

James E. Lose, vice president in charge of operations of Carnegie-Illinois, has been named executive vice president of that company.

Tulsa Bank Plans to Move

First National Bank & Trust Company of Tulsa will move to its new 20-story office and bank building in July. The main banking room is on the second floor, with other banking areas on the basement level and the third, fourth and fifth floors. Sunray Oil Company will occupy the 15th through the 19th floors.

Roebling Company Names Agents

John A. Roebling's Sons Company, Roebling, N. J., has appointed three new agents for insect wire screening, galvanized hardware cloth and industrial wire cloth. They are Flynn and Enslow, San Francisco; Industrial Wire Products Corporation, Los Angeles; and Pacific Wire Works Company, Seattle.

Worthington Names Eastern Manager

A. M. Boehm has been appointed eastern manager, Engine division, for Worthington Pump and Machinery Corporation. He will handle sales for gas and oil pipe lines equipment and oil and gas engines for all service. He will continue to headquarter in the New York district office.

Boehm has been with Worthington 25 years as engine sales specialist. He succeeds W. L. Russell who has been assigned to handle Canadian sales for John Inglis Company, Worthington affiliate.

Universal Announces Promotions

Universal Oil Products Company, Chicago, has promoted M. P. Venema, formerly head of the Patent department, to vice president, and George A. Bockman, assistant treasurer, to treasurer.

Scurry Supply House Established

R. C. Flash has been named manager of Petroleum Pipe and Supply Company's new offices and supply house, located on the Lubbock Highway and established to serve Scurry County oil fields.

Sales Engineer Joins Ingalls

W. D. Kent has joined the Ingalls Shipbuilding Corporation as sales engineer. Kent was formerly chief engineer for the Salt Dome Oil Corporation and Tidelands Oil Corporation, an affiliated company.

Export Representative Is Appointed

Jack Askins, 233 Broadway, New York 7, has been appointed foreign sales representative for Sterling Packing and Gasket Company, Houston, and Drilling Equipment Manufacturing Company, Oklahoma City.

Jack Askins

Askins has been engaged in oil industry sales and engineering since 1935, with the exception of five years with the U. S. Army Corps of Engineers. He spent two years in South America as an executive with American Rolling Mills Company, and since 1946 has been export representative for equipment manufacturers.

Petro-Tech Acquires Venezuela Firm

Petro-Tech Service Company, Lane-Wells Company affiliate in Venezuela, has acquired all property and license rights of Seismograph Service Corporation of Delaware in its well logging and shaped-charge perforating business in Venezuela. Operations in Venezuela are directed by Russell W. Keener and Keith H. Miner, vice presidents of Petro-Tech.

Al Seaman Joins Oil Base Sales

Al Seaman has joined Oil Base, Inc., as service engineer in the San Joaquin Valley for Black Magic oil base drilling fluid and mud conditioning products. Seaman was formerly with the Baroid Sales division, National Lead Company, served with Macco, Inc., in California and Wyoming, and in the Los Angeles Basin for Oil Well Chemical Company.

United Supply Names Manager

H. C. Thornton, formerly field salesman for United Supply and Manufacturing Company at Pauls Valley, Okla., will be manager of the company's new store at Elk City, Okla.

Honeywell Branch Office Opens

Minneapolis-Honeywell Regulator Company has opened a branch office in Binghamton, N. Y., with Sam Hauser, formerly of the Syracuse office, in charge. The new branch will handle products of the Heating Controls division. Sales and service of products made by the Commercial and Industrial divisions will continue to be handled from Syracuse

Donahue Heads Mack Atlantic Area

J. M. Donahue, Mack-International Motor Truck Corporation vice president, has been named manager of the Atlantic division, with headquarters in Philadelphia. The area includes Pennsylvania, Delaware, Maryland and the District of Columbia. Donahue joined the company in 1924 as a salesman.

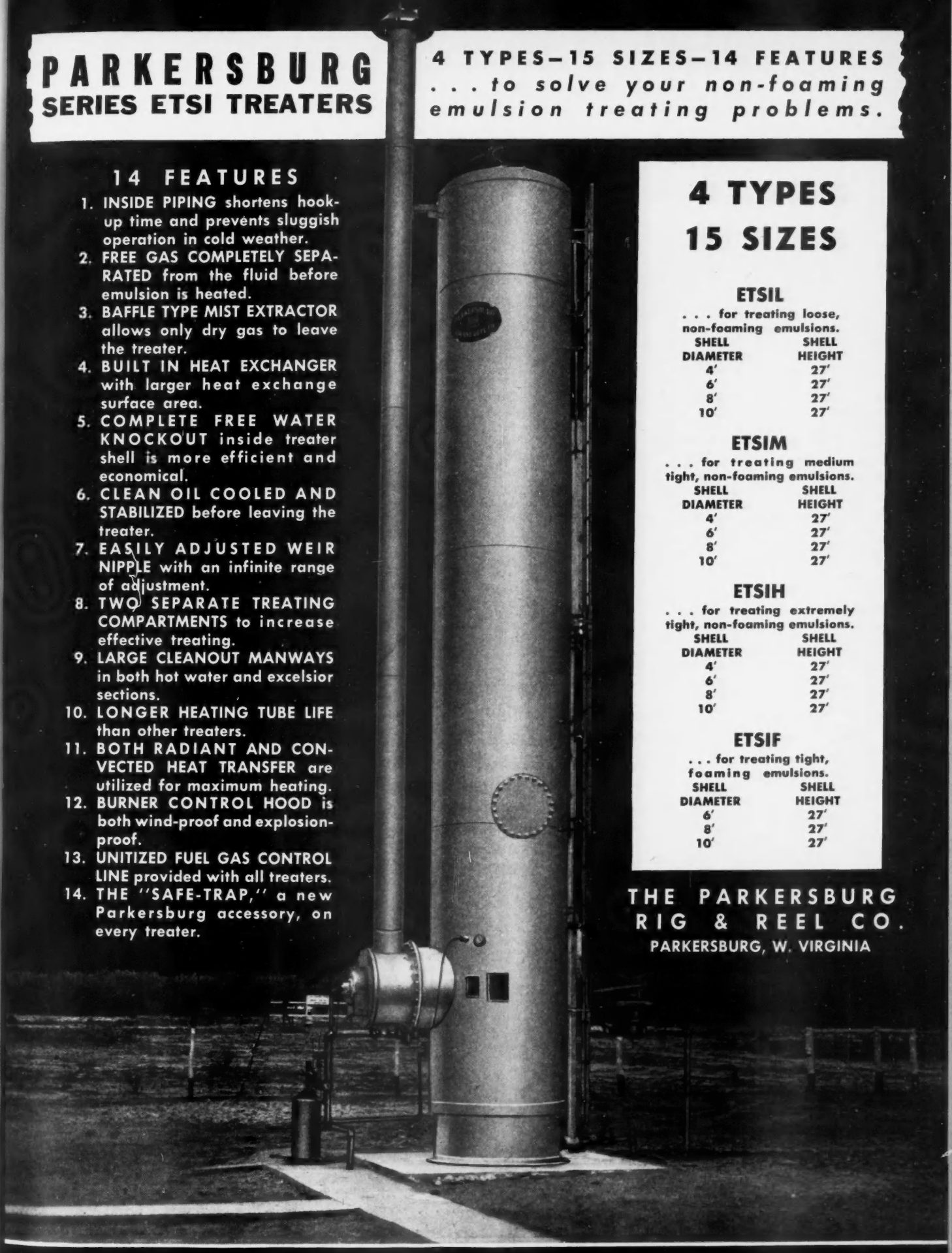
DAY AND NIGHT REPAIR SERVICE on any Brewster drilling rig in the continental U. S. is available from the new Service department of The Brewster Company, Inc., of Shreveport. Other make drilling rigs in the Mid-Continent area will also be serviced by the new department. Herbert Wenk, who has been with the company three years, heads the department. Shown is part of the department's personnel and equipment.

PARKERSBURG
SERIES ETSI TREATERS

4 TYPES—15 SIZES—14 FEATURES
. . . to solve your non-foaming emulsion treating problems.

14 FEATURES

1. INSIDE PIPING shortens hook-up time and prevents sluggish operation in cold weather.
2. FREE GAS COMPLETELY SEPARATED from the fluid before emulsion is heated.
3. BAFFLE TYPE MIST EXTRACTOR allows only dry gas to leave the treater.
4. BUILT IN HEAT EXCHANGER with larger heat exchange surface area.
5. COMPLETE FREE WATER KNOCKOUT inside treater shell is more efficient and economical.
6. CLEAN OIL COOLED AND STABILIZED before leaving the treater.
7. EASILY ADJUSTED WEIR NIPPLE with an infinite range of adjustment.
8. TWO SEPARATE TREATING COMPARTMENTS to increase effective treating.
9. LARGE CLEANOUT MANWAYS in both hot water and excelsior sections.
10. LONGER HEATING TUBE LIFE than other treaters.
11. BOTH RADIANT AND CONVECTED HEAT TRANSFER are utilized for maximum heating.
12. BURNER CONTROL HOOD is both wind-proof and explosion-proof.
13. UNITIZED FUEL GAS CONTROL LINE provided with all treaters.
14. THE "SAFE-TRAP," a new Parkersburg accessory, on every treater.



4 TYPES
15 SIZES

ETSIL
. . . for treating loose, non-foaming emulsions.

SHELL DIAMETER	SHELL HEIGHT
4′	27′
6′	27′
8′	27′
10′	27′

ETSIM
. . . for treating medium tight, non-foaming emulsions.

SHELL DIAMETER	SHELL HEIGHT
4′	27′
6′	27′
8′	27′
10′	27′

ETSIH
. . . for treating extremely tight, non-foaming emulsions.

SHELL DIAMETER	SHELL HEIGHT
4′	27′
6′	27′
8′	27′
10′	27′

ETSIF
. . . for treating tight, foaming emulsions.

SHELL DIAMETER	SHELL HEIGHT
6′	27′
8′	27′
10′	27′

THE PARKERSBURG RIG & REEL CO.
PARKERSBURG, W. VIRGINIA

PARKERSBURG

EQUIPMENT and SERVICE SUPPLIERS' NOTES

A NEW CORPUS CHRISTI WAREHOUSE for A-1 Bit and Tool Company was opened at 3106 Agnes Street to serve the southern Gulf Coast area. Left to right are V. D. Bowen, operator; R. Larry Agee, District Manager; J. W. Ritter, Jr., salesman; T. R. Swenk, salesman; H. B. Fikes, warehouseman; J. S. Cook, salesman; Henry Dunning, salesman. Jack Pratt, operator is not shown.

Canadian Tank Firm Is Organized

Maloney-Crawford Tank and Manufacturing Company, Tulsa, has formed Maloney-Crawford of Canada, Ltd., to handle its Canadian business.

George M. Cheatham, Jr., who has been representing Maloney-Crawford in Canada, has been placed in charge, with headquarters in Edmonton.

National Opens Ringwood Store

The National Supply Company has opened a store at Ringwood, Okla., under the supervision of W. M. Jones, Oklahoma City, district manager. R. L. Johnson, formerly manager of the Lindsay, Okla., store is manager at Ringwood. Ralph F. Blair, formerly at Oklahoma City, is field sales representative. W. D. McNamara, also on the Ringwood staff, was formerly at the Seminole store.

Flannery Is Vice President's Aide

Charles A. Flannery has been named special assistant to Ralph W. Seely, vice president—sales, Los Angeles, for Consolidated Western Steel Corporation. Flannery was manager of the Plate division at the Maywood plant prior to World War II, when he was with the U. S. Army Corps of Engineers.

Prompt Attention Given to Foreign Orders

"THE LUSTROUS SEVEN STAR BEAUTY"

World's Best Map Filing Cabinet

• CONVENIENT • INSTANT REFERENCE • SPACE SAVER • INSTANT FILING • DUST PROOF • RUST PROOF • MEDDLER PROOF

Ultra Attractive fits the furniture scheme of any office.

Instant Adjustment—for maps or tracings from 12" to 54" long. Each Well 2" x 2", equipped with individual wood slide with holes on 2" centers, through which one screw when matched to hole in adjustment block and tightened, automatically gives perfect alignment at top for all length maps. Substantial lock—Individually keyed.

Exterior of cabinet made of 3/4" five ply beautiful grained hardwood mitered locked joints, banded edges on door and top. Interior partitions 3/8" thick, and 1/4" slides, all three ply veneer of southern hardwood or fir.

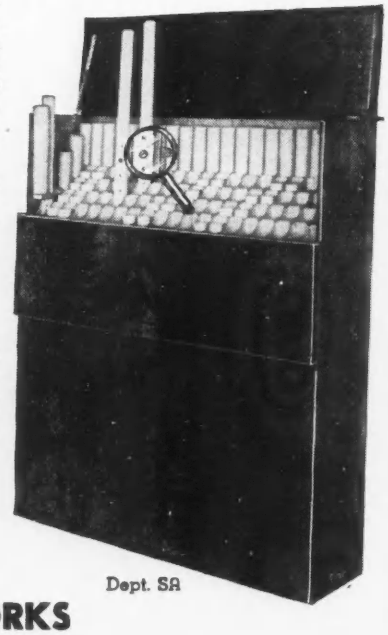
OVERALL DIMENSIONS—AND PRICES

	Capacity	Width	Height	Depth	Price
60	"	29 3/8"	57"	13 3/4"	$107.25
75	"	36 3/8"	57"	13 3/4"	123.75
100	"	47 3/8"	57"	13 3/4"	140.25
160	"	47 3/8"	57"	20 1/4"	183.75
200	"	59 1/2"	57"	20 1/4"	217.25

All prices are F.O.B. Houston, Texas. Delivery: From ten to thirty days.

Finished: Walnut, Oak, Mahogany, Olive Drab Green, Natural or Blond. Other type cabinets designed to suit your needs. Information on request.

We specialize in Drafting Boards, Light Tables and other types of cabinets, made to your specifications.



Dept. SA

PORT CITY CABINET WORKS

609-13 Quitman St. HOUSTON 9, TEXAS Phone P-0725

Youngstown Names Sales Manager

Roy A. Curl has been appointed manager of The Youngstown Sheet and Tube Company's Sales Promotion department. Curl joined the company in 1925 and for the last 15 years was assistant to the sales promotion manager.

Streger Joins Manufacturing Firm

Jim Streger, formerly district manager for International Cementers, Inc., has joined the sales staff of Oil Well Manufacturing Corporation, Los Angeles. He has moved to Ventura, Calif., to serve the area from Newhall to Santa Maria. He is under the supervision of Best Dawson, sales manager for Red Devil slush pump products.

Rozner Named Aetna Works Manager

J. J. Rozner has been appointed works manager of Aetna Ball and Roller Bearing Company, Chicago. Rozner joined the company 21 years ago as a draftsman in the Engineering department, and for the past ten years has been chief engineer.

Dowell Engineer Moves to Houston

John S. (Jack) Talbot, development engineer for Dowell Incorporated in Alice, Texas, has been promoted to district sales engineer and transferred to the Houston area office. Tom J. Tighe, service engineer at Houma, La., has been promoted to sales engineer at Victoria, Texas, and Joe P. Moran, Victoria sales engineer, has been transferred to Alice.

John S. Talbot

Talbot, a University of Oklahoma graduate in petroleum engineering, went to Alice in 1947 as development engineer. He joined Dowell in 1946.

Tighe, a graduate of Texas A. & M. College, started with Dowell as service engineer in Lafayette, La., in June, 1948.

Moran has been in Victoria since January, 1949, having transferred there from Grayville, Ill.

ICI Is Patterson-Ballagh Agent

International Cementers, Inc., is now stocking Patterson-Ballagh oil field specialties in the Rocky Mountain area. The P-B line includes wipers, bumpers, wire line guides and stabilizers and production products.

Rockwell Moves Instrument Branch

Rockwell Manufacturing Company has moved the main part of its instrument manufacturing facilities from Pittsburgh to its Macnick division in Tulsa. Products involved were orifice meter, integrator and related parts.

String Shot Agent Is Appointed

McCullough Tool Company, Los Angeles, has been appointed by Ford Alexander as a licensed service representative for the Ford Alexander String Shot, a device for backing-off or unscrewing drill pipe.

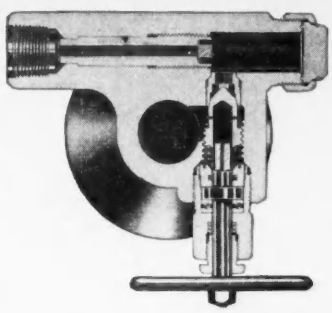
Stone Rejoins Bucyrus-Erie Sales

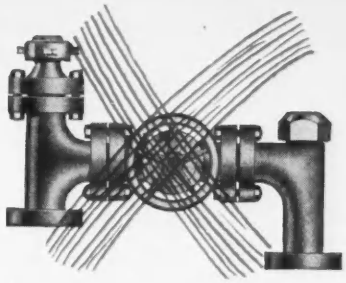
Selden Stone, formerly manager of drill sales with International Derrick and Equipment Company, has rejoined Bucyrus-Erie Company, as well drill sales representative, Williamstown, W. Va. Stone had previously been with Bucyrus-Erie more than seven years.

O-C-T "JE"

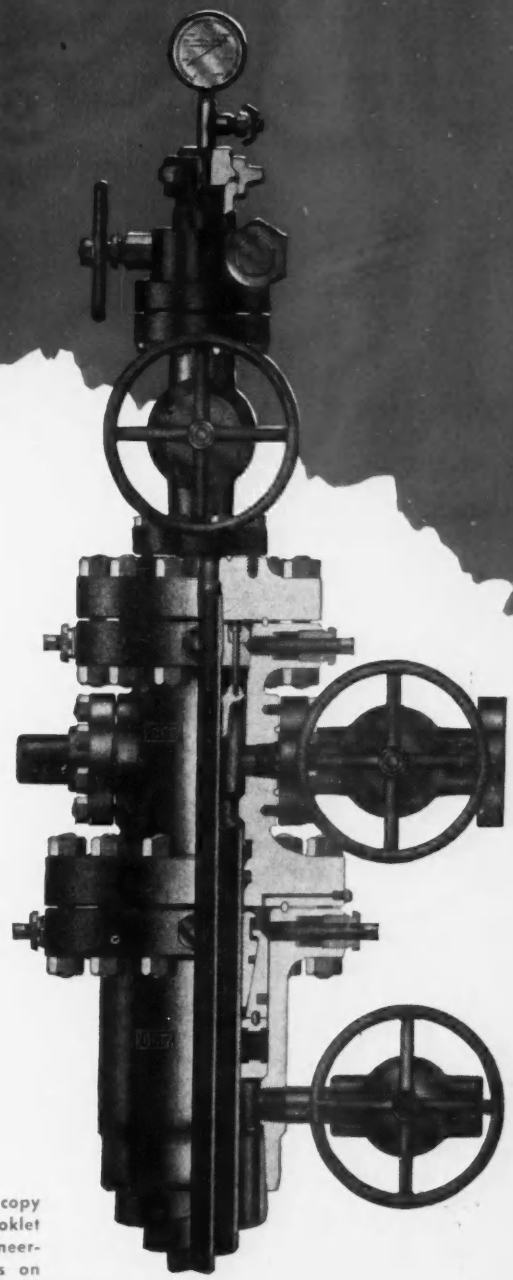
FLOW CONTROL UNITS

Save more than 90% over conventional tubing wings!





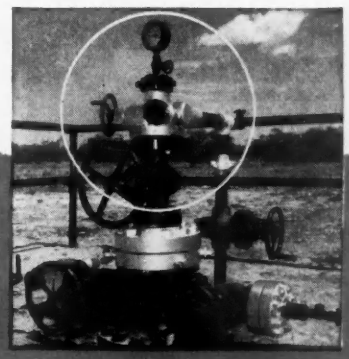
In a single, compact unit, the O-C-T "JE" Flow Control Unit replaces a tee or cross, wing valve, choke and bottom hole pressure adapter.



This compact, easy operating O-C-T "JE" Flow Control Unit . . . adaptable to either positive or adjustable chokes . . . performs the functions and takes the place of a Christmas Tree cross or tee, wing valve, adjustable or positive choke and the upper bottom hole pressure connection adapter. It eliminates the flange connections between the tee and the bottom hole test adapter, between the tee and the wing valve and between the wing valve and the choke. Thus, O-C-T "JE" Flow Control Units effect a cost saving ranging as high as 90 per cent when used to replace 10,000 lb. test conventional wings. In addition, O-C-T "JE" Flow Control Units effect weight savings up to 70% . . . operate free and easy at high pressures . . . provide quick, easy field maintenance.

O-C-T "JE" Flow Control Units are now proved in service by more than 2000 installations. They are available through all recognized supply stores.

Write today for your free copy of a 16-page illustrated booklet which gives complete engineering specifications and prices on the "JE" Flow Control Unit and conventional wings.



The operator of this 6000 lbs. test O-C-T Christmas Tree made a substantial saving when he specified the "JE" Flow Control Unit.

Oil Center Tool Co.

P. O. Box 3091, Houston, Texas

Export Representatives: Venezuela, Colombia, Peru, and Ecuador—Berry & Hall, Apartado No. 304, Maracaibo, Venezuela—Sterling Areas—Le Grand, Sutcliff & Gell, Ltd., Southall, Middlesex, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston 1, Texas.

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Top Executives Are Elected

Board of directors of Allegheny Ludlum Steel Corporation has elected H. G. Batcheller, company president, chairman of the board, with E. B. Cleborne, executive vice president, succeeding him as president. Cleborne was succeeded by Edward J. Hanley, vice president in charge of finances and treasurer. Clark W. King, vice president, was named treasurer, and T. Ames Wheeler, manager of the costs and statistics department, was elected to the new office of controller.

The board also accepted the resignations of William E. Ruder and John W. Belanger as directors.

Distributors in Three Cities Named

Keyes Tank Companies of Salt Lake City and Casper, Wyo., and Harold E. Davis of Los Angeles have been appointed distributors by T. D. Williamson, Inc., Tulsa pipe line equipment manufacturer.

Teflon Coatings Agent Named

W. S. Shamban & Company, Los Angeles, sales and engineering representative for Pacific Tank & Industrial Coating Company, is equipped to apply Teflon coatings on pipe, tanks, valves, rolls and other equipment where corrosion resistant or non-wetting surfaces are required.

Dallas Firms Move to New Quarters

The Dallas sales office of Tennessee Coal, Iron and Railroad Company and American Steel and Wire Company Mid-Continent sales office for oil field wire rope have moved to 902 First National Bank Building, Dallas, where they will occupy joint quarters. The offices, both representing U. S. Steel subsidiaries, were formerly at 703 Praetorian Building.

KEYSTONE TOOL CORPORATION'S new oil tool manufacturing plant is now in operation at 5325 Kirby Drive, Houston. Chief product of the plant is a simplified slush pump piston.

Marsh Instrument Names Barnett

R. E. Barnett has been promoted to assistant sales manager of Marsh Instrument Company, sales affiliate of Jas. P. Marsh Corporation. Barnett has been with Marsh for the past nine years in a sales capacity.

Sales Department Changes Announced

J. A. Cuneo, formerly branch manager, Los Angeles, for Fairbanks, Morse & Company, has been transferred to Chicago as manager of the Chicago branch. A. M. McLaren succeeds him at Los Angeles.

John S. King, formerly Chicago manager, has moved to Cincinnati as branch house manager. He succeeds J. S. Peterson who has transferred to Chicago and will be in the sales manager's office.

William H. Kingsley, previously district manager of the New York office of Ideal Electric & Manufacturing Company, has joined Fairbanks-Morse as manager of the Electrical division, Chicago.

Midland Law Offices Established

W. P. Z. German, Jr., formerly a partner of the firm of Stubbeman, McRae and Sealy, has opened general law offices at 110 North Big Spring Street, Midland, Texas, and will specialize in oil and gas matters.

Pollock Joins Tulsa Insurance Firm

Elmer W. Pollock, former vice president and assistant treasurer of Deep Rock Oil Corporation, has resigned to become an equal sharing partner in a Tulsa insurance firm, William F. Stahl & Company.

Tube Turns Plans Canadian Plant

Tube Turns of Canada, Ltd., is establishing a plant at Chatham, Ontario, to manufacture welding fittings. Operations will start at the two-story, brick building in April.

Engineer Joins Welex Jet Services

E. L. (Bud) Blackman, formerly with Baker Oil Tools, Inc., Natchez, Miss., is now service and sales engineer for Welex Jet Services in Houston.

Ralph B. Carter Names Agent

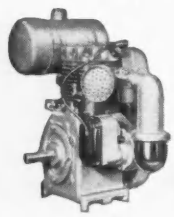
Charles Wheatley Company, Tulsa, has been named representative for Ralph B. Carter Company in Oklahoma and Kansas. Wheatley will handle the Carter "Humdinger" line of pumping units.

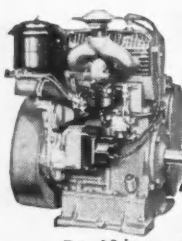
Mercier Joins Mountain Iron

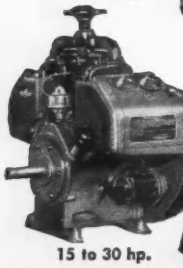
V. J. (Mike) Mercier has resigned as sales engineer for Lane-Wells Company at Wichita, Kans., and has been appointed sales manager for Mountain Iron and Supply Company in the Kansas-Oklahoma district.

Trucking Contractor Moves Quarters

Hunsaker Trucking Contractor, Inc., has moved its Houston office and terminal to 6526 Long Drive.


3 to 9 hp.


7 to 13 hp.


15 to 30 hp.

1 2 3 Good Reasons Why
OIL FIELD MEN
CHOOSE WISCONSIN
POWERED Equipment

As in all other types of power work in a 3 to 30 hp. power range, Wisconsin Heavy-Duty Air-Cooled Engines are the most called-for, the most used, and the most respected in the oil field. Each of the three different types . . . 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder . . . carries the same heavy-duty service features, and each has a broad field of power applications.

Every Wisconsin Engine from the smallest to the largest runs on self-cleaning, thrust-absorbing Timken Tapered Roller Bearings at *both ends* of the crankshaft, permitting direct drive from the extended crankshaft. Every Wisconsin Engine provides maximum freedom from cooling troubles, from sub-zero to 140° F. Every Wisconsin Engine is equipped with a high tension, rotary type OUTSIDE Magneto, with Impulse Coupling, for fast starting and dependable ignition. All good reasons why *your equipment* should be powered by these good engines.

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
510 Atlas Building, Tulsa, Oklahoma
M & M Building, Houston, Texas
Oil field distributors for Wisconsin Engines and all types of utility units.

Another Pittsburgh First!

Gives You Casing Tested in Tension up to 10,000 PSI to Reduce "Leakers". Saves Time and money in the Field

Again Pittsburgh Steel Company is the first to provide a method of adequately testing casing for deep wells to give you fewer leakers and long service with safety. This new development will save you time and money in the field. It is made possible with our new Hydrostatic Testing equipment capable of testing casing *in tension* up to 10,000 PSI.

The new Hydrostatic *Tension* Testing Method is the result of intensive development work on similar equipment first introduced by Pittsburgh Steel in 1939. It was capable of testing at pressures up to 3000 PSI and through years of use proved to be the best method for testing casing ever developed. With the new, heavier equipment Pittsburgh Steel is the only company that can meet your needs for extremely high pressure hydrostatic testing in *tension*. By this method the coupling end of the casing joint is sealed with a threaded plug which is mounted in a floating carriage. The pipe is filled with water and as the pressure is built up to the desired PSI, the carriage is free to move, thus avoiding any compression or column stress on the pipe. This permits the internal pressure to exert tension through the body of the pipe as well as on the threads, thereby closely approaching operating conditions in the well.

It will pay you to investigate the possibility of having your Pittsburgh Seamless Casing Hydrostatically tested *in tension*. Ask your Pittsburgh field engineer for full particulars or write for information to Pittsburgh Steel Company, Department WO, Grant Building, Pittsburgh 30, Pa.

Pittsburgh Steel Company

HERE'S HOW CAMCO
GAS LIFT VALVES
PREVENT
SCRAMBLED
PRESSURES

THE ONLY GAS LIFT VALVE
WITH INSURED WELL ACTION

The opening pressure of a Camco Valve is the result of two forces operating together. These two forces—nitrogen charged Camcoized bellows and a compressed stress-equalized Monel Spring — have proved the answer for a perfectly operating and dependably durable gas lift valve. Thus, this exclusive Camco design provides a gas lift valve that gives correct, positive action under the most severe well conditions and eliminates any possibility of scrambled pressures.

Camcoizing . . . an exclusive Camco process which pre-forms the valve bellows with 5000 lbs. differential pressure . . . tests and conditions the bellows for positive well action. Camco manufactures a complete line of Gas Lift equipment. Get all the facts from your Camco Representative . . . or phone or write Camco, Inc., 1108 Scanlan Building, Houston.

Camco Gas Lift Valves have proved far superior to any other gas lift valve on the market today!

NOW TIME HAS PROVED THE
SUPERIORITY OF THE CAMCO DESIGN

For more than two years, Camco Valves have been in the most demanding services in the fields . . . because we gladly took the toughest ones to prove the merits of the Camco design. When pulled because of the encroachment of too much salt water, these Camco Valves have consistently tested right on the money after 18, 19, and 24 months continuous service. You owe it to yourself to not buy any gas lift valve until you know the full story of the Camco design.

CAMCO

GAS LIFT EQUIPMENT AND SERVICE

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Norris Names Assistant Sales Head

Arthur Miller, Jr., has been appointed assistant sales manager for W. C. Norris, Manufacturer, Inc., Tulsa. He has been with the company since January, 1936, when he started work in the shop and warehouse. From December, 1938, until September, 1942, he was at St. Elmo and Mt. Carmel, Ill., as warehouseman, store manager and field salesman. He then joined the Air Corps and after his release in October, 1945, he rejoined Norris as a field man. In 1947 he returned to the Tulsa office and remained as a city salesman until his present appointment.

Arthur Miller, Jr.

Bethlehem Assigns Representatives

David C. McLaughlin, formerly engineering representative for Bethlehem Supply Company at Dallas, has been appointed oil field engineering representative for Bethlehem Steel Export Corporation, with headquarters in New York City.

Bethlehem Steel Export Corporation is exclusive export distributor for products of Bethlehem Supply Company, Tulsa.

Fred Parks has been appointed division sales manager for the Houston-Gulf Coast area for Bethlehem Supply, with J. V. Spalding as division machinery manager. The area includes all Bethlehem operations from New Orleans to McAllen, Texas.

Schmidt Joins Loffland Brothers

Robert C. Schmidt has joined Loffland Brothers Company, Tulsa, and will make his headquarters in Midland, Texas. He will serve as contract representative in the Permian Basin area.

Schmidt was in charge of Reed Roller Bit Company's Tulsa sales office before joining Loffland Brothers. He previously had been with Technical Oil Tool Corporation, Carl B. King Drilling Company, and Hutchison Engineering Works. He served as a naval officer for three years during World War II.

Robert C. Schmidt

Firm Name Changed to JETCO, Inc.

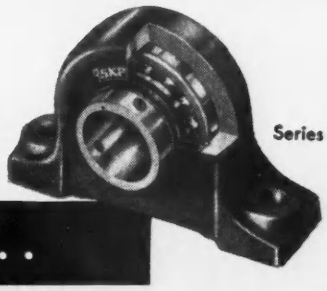
Board of directors of Jiffy Excavator Tool Company voted to change the name of the company to JETCO, Inc. The company has exclusive patent licenses for manufacture and distribution of "Jiffy" rooter points, buckets, and other ditching machine equipment.

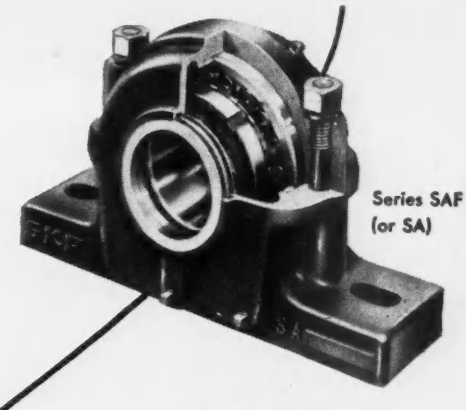
E. J. Lydon has been elected vice president of the firm, and will be in charge of the new Eastern division office at Houston.

Contracting Firm Is Organized

T. A. Hester is president of the recently organized Oklahoma Contracting Corporation, which has headquarters in the Mercantile Bank Building, Dallas, and offices in the Commerce Building, Houston.

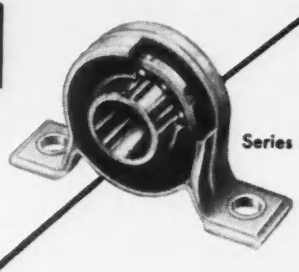
Other officers are J. R. Horrigan, T. R. Jones, Paul R. Halbert, M. W. Staples, Ben O. Law and W. H. Law. All principals of the firm have been connected with the oil and gas pipe line construction business for many years.

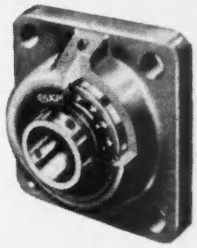

Series SUS

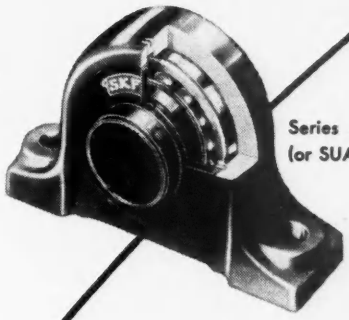

Series SAF
(or SA)

One for every place . . .

and one place to get them all


Series SES


Series FUS
(or FUA and FUAR)


Series SUAR
(or SUA)

Series SDAF

PILLOW BLOCKS ENGINEERED BY SKF

Specify pillow blocks and flanged mountings by SKF and you get bearings and housings engineered as a unit. What does this mean to you? It means you get the full benefit of SKF's skill and precision methods of manufacture. It means you're sure of minimum friction and trouble-free, low-cost operation. It means efficient seals that retain lubricant . . . keep out dust and abrasive elements. It means minimum maintenance . . . maximum efficiency.

SKF supplies 5 basic types of pillow blocks for shafts from ½-inch to over 9-inches . . . and 2 basic types of flanged mountings for shafts from ½-inch to 2 7/16-inches. Whether you need Series SES for lightly loaded applications or Series SDAF to withstand unusual shock and heavy thrust loads . . . or any intermediate type . . . there's an SKF pillow block that's exactly right for the job.

Check your SKF Distributor, he has a stock of these pillow blocks and flanged mountings to meet *all* your requirements. *SKF Industries, Inc., Philadelphia 32, Pa.* 7044

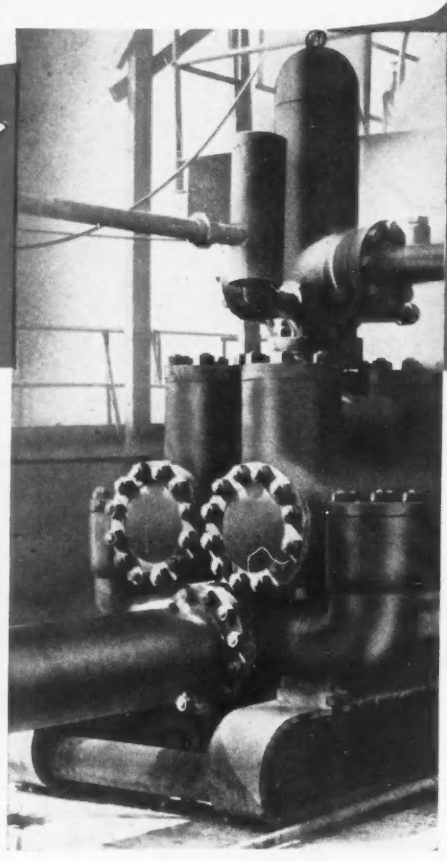
8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

INTEGRITY · CRAFTSMANSHIP · METALLURGY · TOLERANCE CONTROL · SURFACE FINISH · PRODUCT UNIFORMITY · ENGINEERING SERVICE · FIELD SERVICE

SKF PILLOW BLOCKS

Pioneers of the Deep Groove Ball Bearing—
Spherical Roller Bearing—Self-Aligning Ball Bearing

"WE'RE CHANGING OVER TO FALCON LINERS AND RODS"



FIELD TESTS TELL THE STORY!

There's only one way to prove the life of a Slush Pump Liner or Rod and that is to test it out. We have always invited side by side field tests of Falcon Products. On the outcome of such comparisons operators everywhere are learning that *FALCON PRODUCTS LAST LONGER.*

You'll reduce down time and drilling costs when you specify FALCON Slush Pump Liners and Rods.

FALCON PRODUCTS LAST LONGER!

Sold only through leading supply houses

FALCON PRODUCTS, INC.
POMONA, CALIFORNIA

BRANCH WAREHOUSES: HOUSTON, ODESSA, WICHITA FALLS, TEXAS • CASPER, WYO.
OKLAHOMA CITY, OKLA. • SHREVEPORT, LA. • BAKERSFIELD, LONG BEACH, CALIF.
Export Representative: Guy E. Daniels, 30 Rockefeller Plaza, New York 20, N. Y.

EQUIPMENT and SERVICE SUPPLIERS' NOTES

William J. Russell

Nelson D. Griswold

Dowell Elects New Directors

William J. (Bill) Russell, assistant manager in Tulsa, and Nelson D. Griswold, former chief engineer in Tulsa, have been elected to the board of directors of Dowell Incorporated.

Russell had been engineer with Cities Service Company and Phillips Pipe Line Company before he joined Dowell in 1934.

Griswold is now assistant general manager and a director of Dowell's parent company, The Dow Chemical Company, in Freeport, Texas. He is also director and vice president of another Dow subsidiary, Brazos Oil and Gas Company.

Big Four Buys Beaver Tool Shop

John R. Riley and G. C. (Red) Ross, of Big Four Machine & Supply Company, have purchased Beaver Tool & Machine Company, Maysville, Okla., from Fred Wallace and associates. The third manufacturing and distribution point for Big Four products, the shop will retain the name of Beaver tool, and will serve the "Golden Trend" area in Western Oklahoma and North Texas.

The other two Big Four plants are at Clay City, Ill., and Pawhuska, Okla. Riley, who has been in Flora, Ill., has moved to Oklahoma City. Ross will remain in Illinois to manager the Clay City plant, and C. L. Crotts, Pawhuska, has been transferred to Maysville as manager.

Advertising Sections Consolidated

The Colorado Fuel and Iron Corporation has consolidated all its advertising offices. The director of advertising and the Western division advertising manager will continue to be at the Denver general office.

The Advertising department of Wickwire Spencer Steel division, formerly in New York, will now be the Eastern division Advertising department, and will be with the Denver office. Robert W. Brown has been placed in charge of the Eastern division office.

Youngstown Announces Retirements

Roy M. Welch, assistant to the president of The Youngstown Sheet and Tube Company, has retired after 48 years with the company. Welch joined the company in December, 1901, as storekeeper, and after successive promotions, in 1933 was made assistant to the president in charge of industrial relations for all operations. He relinquished the industrial relations work in May, 1947, but continued in charge of public relations.

Welch is succeeded as assistant to the president by Myron S. Curtis, who has been with the company 38 years in manufacturing, sales and sales promotion work. He was previously manager of sales promotion.

Walter E. Scott, who had been with Youngstown 43 years, has retired. He was manager of flat rolled sales.

Thomas D. Hess has joined the company as assistant superintendent of the Open Hearth department at the Indiana Harbor Works, East Chicago, Ind. He was formerly assistant superintendent of the Open Hearth department for Crucible Steel Company, Midland, Penn.

Ernest Holme has been promoted to superintendent of the Indiana Harbor rolling mills. He succeeds J. M. Mitchell, resigned.

You KNOW WHEN THE VALVE IS CLOSED

WHEN YOU USE THE LAYNE "SIGNAL CLOSING" SET SHOE

This Signal Closing Shoe works in conjunction with the "TS" Packer and signals the operator when the Valve is definitely closed.

It has a brass Back Pressure Valve and a brass Screw Down Valve made of special alloy, with a tensile strength of 75000 pounds per square inch, but is easily milled out.

The Screw Down Unit has tapered acme thread on inside to receive the tapered Letting-In Tool, and has straight acme threads on outside for closing. If pump is run slowly while the Screw Down Valve is being closed, circulation will stop entirely when Valve is closed. When Letting-In Tool is released from Valve, circulation will start again.

THE LAYNE

TYPE "TS" PACKER

You can make one trip into the hole do the job of two by using the Layne "Tubing Set" Packer. You can save time and expense of coming out with the Setting Tool and it can be used with any type tubing head or christmas tree.

Write for complete catalog

THE LAYNE AND BOWLER COMPANY

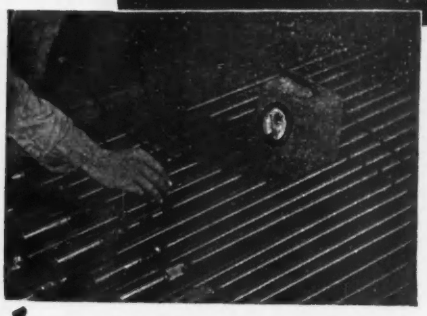
EXPORT:
Jeff Tucker
Room 1636
30 Rockefeller Plaza
New York, N. Y.

General Office & Factory
8000 Market Street Houston, Texas

WEST COAST:
Layne & Bowler Corp.
900 Santa Fe Ave.,
Los Angeles, Cal.

4 reasons why

CORROSION ENGINEERS PREFER TUBE-KOTE

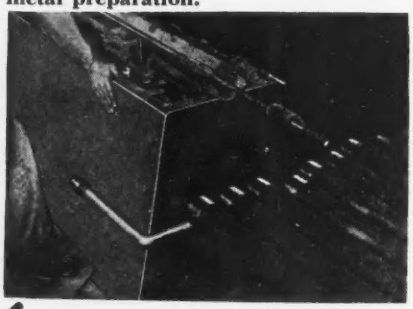


1 DIELECTRIC STRENGTH

The thickness of "TK-2" thermo-setting (baked-on) plastic coatings are accurately controlled for the maximum dielectric strength. In the above view a Tube-Kote inspector is gauging the coating thickness on sucker rods.

2 THOROUGH INSPECTION

With the use of recognized optical instruments internal surfaces of all tubular goods receive the most thorough and careful inspection to assure uniform cleanliness and proper base metal preparation.



3 RIGID PLANT CONTROL

Each and every phase of the Tube-Kote process, from the initial cleaning, through sandblasting, coating and baking in several steps is a matter of rigid plant control—thus assuring the highest degree of uniformity and quality.

4 AUTOMATIC EQUIPMENT

The Tube-Kote plant is equipped with many improvements in automatic mechanical facilities. Among these is the Tube-Kote fully automatic internal coating unit shown above, which applies a carefully controlled film in each coating operation.

TUBE-KOTE

First Name In Corrosion Resistance

2520 HOLMES ROAD . . . P. O. BOX 8123, HOUSTON, TEXAS

WIRE, PHONE OR WRITE FOR TUBE-KOTE TECHNICAL SERVICE BULLETIN

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Chiksan Export Names Representatives

Chiksan Export Company has appointed A-Z Export Company its representative in Venezuela and Colombia, with headquarters in Maracaibo and Guanta, Anzoategui, Venezuela. James E. Berry and Harry F. Simons are partners in A-Z Export.

Sociedad Commercial Argentine is Chiksan representative in Argentina. W. A. Koscioulek is manager of the firm, with headquarters in Buenos Aires.

Brazilian representative is Sociedade Importadora de Equipamentos, Ltda. Nicholas A. Schillen is the Chiksan agent in Cuba.

Representation in the British West Indies is handled by Industrial Agencies, Ltd., under the management of C. A. Fernandes, with headquarters in Fernando, Trinidad.

Mid-Continent Appoints L. G. Moore

L. G. Moore has been appointed sales engineer of the Oklahoma City district of Mid-Continent Supply Company.

Moore, a graduate of Oklahoma A. & M. College with a B.S. degree in mechanical engineering, petroleum option, has been associated with the oil industry since 1935. For two years he did production and drilling work for Mexhoma Petroleum Company, and for 13 years he was engineering sales representative for American Chain & Cable Company in Oklahoma, Kansas and North Texas. He served in the Navy during World War II.

L. G. Moore

Three Join McEvoy Sales Staff

Hugh D. Start, R. B. Foster and Arthur J. Felscher have joined the sales organization of the McEvoy Company.

Start, who has had more than 20 years experience in well head equipment, will cover Houston and Gulf Coast as sales engineer. Foster will be representative in the Mid-Continent, and will assist Lawrence G. Wood as sales engineer, with headquarters in Oklahoma City. Felscher, formerly of Houston, has been assigned to Alice, Texas, as a sales engineer.

Graver Announces Assignments

Graver Tank & Manufacturing Company, Inc., East Chicago, Ind., has appointed Harry A. Dennis manager of sales for the Stainless and Alloy Steels division. He will also continue as manager of Weldment sales.

Robert F. Millett has been named advertising manager. He was formerly in charge of midwestern advertising for Cities Service Oil Company (Delaware).

National Names Eastern Manager

William VanVleet has been appointed manager of The National Supply Company's Eastern division, which comprises 32 of the company's supply stores.

VanVleet has been with the company since 1913, and has worked in the stores at Findlay, O., Tilbury, Ontario, and Butler, Penn.

Jerguson Executive Is Elected

James A. Ford, sales manager of Jerguson Gage & Valve Company, Somerville, Mass., was elected vice president and director. He joined the company as sales manager in 1945.

For a Drill Rig

The trucks are waiting to unload the rig as this International TD-14A does the precise job of leveling the site—making the "bed" for the rig. The job is done quickly and correctly by this power-packed descendant of the TD-14, time-tested "work horse" of the oil fields.

Once the "bed" is made, the tractor is on hand to dig slush pits and settling basins and to handle other jobs around the site. The TD-14A is a "natural" for these jobs. It packs even more power than its famous predecessor yet is just as compact and easily moved from place to place.

If you are not yet using International Crawlers in your oil field operations, a visit to your International Industrial Power Distributor will show you some mighty good reasons why you've been missing a bet. You'll find Internationals build a firm and dependable "bed" for profitable oil field operations.

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CRAWLER TRACTORS
WHEEL TRACTORS
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TOPS IN THE FIELD!

LESS COST PER FOOT

Faster Penetration
Greater Footage Per Bit
Less Round-Trips

OUTSTANDING ENGINEERING RESEARCH

Diamond Bits, Washover Shoes, Reamers. Core Barrels, Handling Equipment. Drilling Technique —Field Service.

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California Representative: Mercury Oil Tool Co. Los Angeles - Bakersfield

Export Representative: R. J. Eiche & Associates, Inc. Los Angeles - New York City

Canadian Representative: James Emrick Company, Ltd. Edmonton, Alberta

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Stewart & Stevenson Enlarges Staff

King D. Boyd, previously district manager in charge of sales in the Gulf Coast area for Detroit Diesel Engine division of General Motors Corporation, has joined Stewart & Stevenson Services, Houston, as sales representative.

King D. Boyd

Boyd was district sales engineer for Reed Roller Bit Company in Southern Oklahoma and North Texas, prior to World War II. He also served with the U. S. Corps of engineers in the Panama Canal Zone, and headed the standards department of the Emerson Electric Company in St. Louis.

Bovaird Appoints Manager

F. J. (Doc) Robbins, Oklahoma City, has been appointed district manager for The Bovaird Supply Company stores in Oklahoma. Robbins joined Bovaird in 1924 as a price clerk, and in 1930 was appointed district manager for Oklahoma. In 1945 he formed a business of his own to handle specialty accounts.

Iverson Makes Sales Changes

R. B. Yanaway has been transferred from Fort Worth to Houston as district sales manager for Iverson Supply Company. J. H. Beard, formerly field salesman at Odessa, Texas, has been moved to Fort Worth as city salesman for Fort Worth and Dallas. E. E. Jackson, formerly field salesman at Kermit, Texas, has been transferred to Odessa.

H. V. Lawver has been named purchasing agent of the company, succeeding W. D. Taylor, resigned.

Sheffield Steel Announces Changes

Sheffield Steel Corporation announced six appointments in the purchasing divisions at Houston and Kansas City. In the Houston division, J. A. Street has been named purchasing agent, and G. R. Major was appointed assistant purchasing agent in charge of raw materials and stores. D. J. Weaver was named in charge of purchases of miscellaneous materials and supplies.

H. L. Kenagy has been placed in charge of all purchasing except pig iron and scrap for the Kansas City division. W. M. Alexander, supervisor of general stores and raw materials, was promoted to assistant purchasing agent in charge of raw materials and stores. R. W. Duncan was made manager of scrap purchases, and is also in charge of pig iron purchases.

Odessa Supply Firm Established

E. L. Heard Company has purchased the Green Head Supply Store in Odessa, Texas, and has formed the Mallard Supply Company. E. L. Heard is president of the new firm, Roy Pepper is vice president, and V. A. Nelson is secretary-treasurer and general manager.

Morse Names Chicago Manager

Robert G. Holmes has been appointed branch manager of the Chicago sales office of Morse Chain Company, division of Borg-Warner Corporation. Holmes has been a sales engineer for the past 12 years in the Chicago and St. Louis areas.

J. A. Shomer Company, 11201 Berea Road, Cleveland, has been appointed Morse distributor in the Cleveland area.

EQUIPMENT and SERVICE SUPPLIERS' NOTES

Fred E. Link

Gordon M. Amstutz

Oilwell Promotes Two Executives

Fred E. Link, general works manager for Oil Well Supply Company, has been named to a special post of assistant to the president, and will study and develop programs for facilities improvement to provide economies in manufacturing and distribution. He will headquarter in Dallas.

Gordon M. Amstutz, chief industrial engineer, succeeds Link as general works manager. He is located at the company's Imperial Works at Oil City, Penn.

Link joined the company as assistant to vice president in January, 1946, and became general works manager on January 1, 1949. Amstutz has been with "Oilwell" since January, 1949. He previously had been director of production for Denison Engineering Company, Columbus, Ohio.

Falk Announces Promotions

The Falk Corporation, Milwaukee, has appointed Arthur L. Larson as assistant to the sales manager, and manager of the Sales Inquiries division.

William J. Urban, former special representative in coupling sales, has been named manager of coupling sales. The new manager of distributor sales is Don K. Lambert, who was previously special representative. Roland E. Govan heads sales promotion, a new department. Working with him are Eugene H. Millman and A. H. Kelley.

Former sales trainees appointed to Falk district sales office staffs are Nile F. Sweet, special representative, Distributor division, who goes to Detroit for special training; Harold C. Fleischer, to New York district office; and Elliot G. Heuser, assigned to the Wisconsin sales division.

Core Lab Expands Reservoir Section

Core Laboratories, Inc., announces the expansion of its Reservoir Engineering department, and the appointment of Nelson W. Williams as chief reservoir engineer.

Williams was previously district engineer of the West Coast area. A graduate of S.M.U. and the University of Texas. Williams has been with Core Lab since 1939 in an administrative and technical capacity. In his new position, he will be stationed at the company's main offices in Dallas.

Nelson W. Williams

Republic Bank Advances Five

Republic National Bank, Dallas, announced the promotion of George Gibbons, Walter Brogdon, Ike Rainbolt and Millard F. McAllister to assistant cashiers, and T. G. Smith to assistant trust officer. Each has been with the bank for many years.

Capital and surplus of the bank have been increased to $27½ million which results in capital, surplus and undivided profits of $30 million.

ACCURATE PIPE CUTS
Quick and Easy

"Anybody does better work with better tools—If they come any better than RIDGID I've never seen 'em."
RIDGID
No. 2 HEAVY DUTY
1/8 TO 2
If this Housing Ever Breaks or Distorts we will replace it Free

RIDGID Cutters roll right through all kinds of pipe and conduit

● It's really a cinch to cut pipe extra fast with the popular efficiency-balanced RIDGID cutter. Thin heat-treated tool-steel blade leaves practically no burr. Every cutter factory-tested to make sure it tracks perfectly. Your choice of five sizes to 6" pipe; four-wheel cutters to 4." Choose the favorite of men who know fine tools—buy RIDGID cutters at your Supply House.

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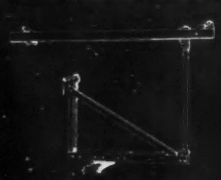


Pumping Jacks

Stop Cocks

Casing Heads

AT YOUR INDEPENDENT SUPPLY STORE

ALTEN'S FOUNDRY & MACHINE WORKS, INC.
LANCASTER, OHIO, U. S. A.

ALTEN

EQUIPMENT and SERVICE SUPPLIERS' NOTES

San Antonio Branch Office Opened

Bethlehem Supply Company, Tulsa, has opened a sales office in the Milam Building, San Antonio, with Guy Brown, Jr., as engineering representative.

Brown was graduated from the Missouri School of Mines in 1940, with a B.S. degree in metallurgical engineering. After joining Bethlehem Steel Company, he spent one year at Bethlehem, Pa., and was transferred in 1941 to Bethlehem Supply Company's home office in Tulsa. He served as a lieutenant (jg) in the Navy during World War II; and upon his return from military service in 1946, he was assigned to the Oklahoma district office at Oklahoma City as engineering representative.

Guy Brown, Jr.

W. J. Brady, manager of the Southwest Texas district at Corpus Christi, has supervision over the San Antonio branch.

Allis-Chalmers Service Point Named

Roy A. Berentz Company, Inc., Houston, dealer for Allis-Chalmers motors, controls and transformers, has been named certified service shop for Harris, Montgomery, Waller, Fort Bend, Brazoria, Galveston, Chambers and Liberty counties, Texas.

Munford Is American Steel Officer

Walter F. Munford, who started with American Steel & Wire Company as a die-reamer 30 years ago, has been elected vice president in charge of operations. He was most recently assistant vice president. Munford succeeds Harvey B. Jordan, who is now president of the firm.

Geologist Opens Shreveport Offices

Kevil Crider, former geologist with Sohio Petroleum Company, has opened consulting offices at Shreveport.

Mechanical Goods Manager Named

Herbert G. Kieswetter has been appointed assistant general manager of the mechanical goods division, U. S. Rubber Company. He was formerly vice president and assistant general manager of U. S. Rubber Export Company, Ltd.

Worthington Advances Lewis

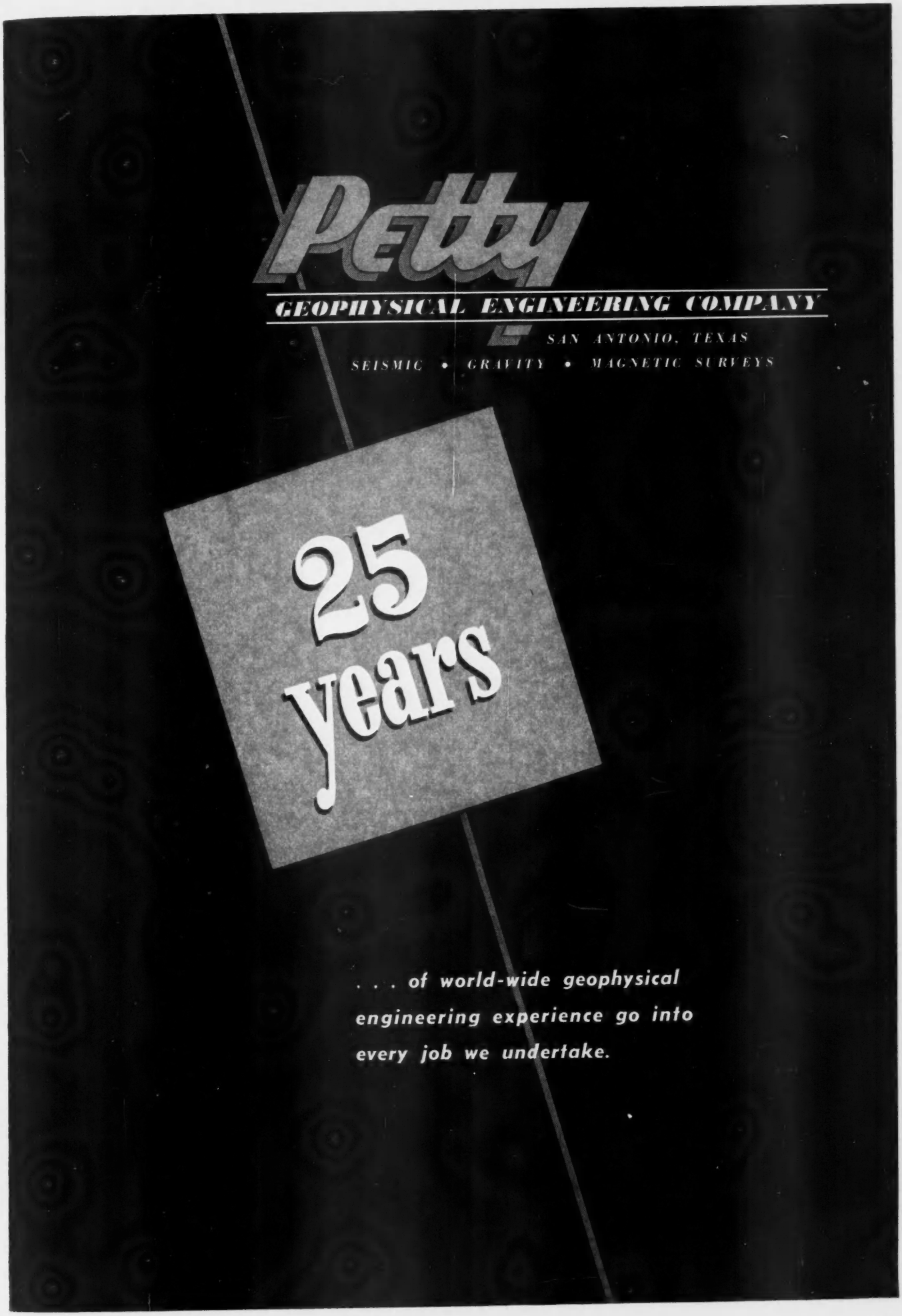
Harry E. Lewis has been named assistant comptroller of Worthington Pump and Machinery Corporation, Harrison, N. J. He succeeds the late Joseph A. Schallenberg. Lewis has been with the company since 1924.

Hevywate Distribution Areas Named

Oil Base, Inc., Compton, Calif., announced that OB Hevywate weighting material is available only in California, Rocky Mountains and abroad. Excessively high weight of the material makes it uneconomical to ship it to domestic fields other than those listed.

National Supply Veteran Retires

Ernest N. Smith, Eastern division manager for The National Supply Company since 1933, has retired. He had been with the company 28 years.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Particulars given of each Company include the Directors and other officials; date of incorporation; seat of operations; nature of business, description of property, refining and other plant, crude oil production; details of capital; dividends paid; and the financial position as disclosed by the latest accounts. Highest and lowest prices of the shares for the last three years.

MANAGERS, ENGINEERS, AGENTS, etc. 426 names and addresses and the names of the companies in the book with which they are connected.

BUYERS' GUIDE—A List of Manufacturers of Oilfield and Refinery Equipment and Accessories comprising 684 headings, giving names, addresses and "who makes it" of English, American and Continental Oilfield Equipment companies.

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EQUIPMENT and SERVICE SUPPLIERS' NOTES

Sonoflux Appoints R. L. Humphrey

Robert L. Humphrey

Robert L. Humphrey has been appointed vice president and general manager of Sonoflux Corporation of Houston, which is now marketing the Sonoflux, a new portable vibro-magnetic inspection unit for use on tools and equipment.

Humphrey was active in the organization of the AAODC and the Petroleum Club of New Orleans.

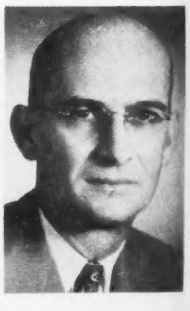
Goodrich Names Secretary, Counsel

Raphael G. Jeter, general counsel of The B. F. Goodrich Company, has been elected secretary and general counsel of the company. He succeeds Willis F. Avery, who has retired after more than 25 years with the company.

Dravo Appoints Tulsa Representative

F. W. Morris, Tulsa, has been appointed representative for Dravo Corporation, Pittsburgh, in the fabrication and erection of piping for the oil industry and other industrial uses. He previously was district manager for Spang-Chalfant division, National Supply Company, at Tulsa.

Consultant Opens Tulsa Office



E. F. Miller

E. F. (Floyd) Miller has resigned as special representative for the Exploration department of Phillips Petroleum Company and opened offices in the Thompson Building, Tulsa, as geological consultant and adviser on exploration problems, deals and drilling.

Miller, who is a graduate of Leland Stanford University, is an active member of the AAPG and a past president of the Shreveport Geological Society.

Wright Names Sales Manager

S. J. Woodworth has been appointed sales manager of the Wright Hoist division of American Chain & Cable Company, Inc., with headquarters at York, Penn. He succeeds A. R. Haskin, resigned. Woodworth has been with the division more than 25 years.

Worthington Announces Changes

Harry E. Lewis has been assigned to the Foreign and Export department, Worthington Pump and Machinery Corporation, Harrison, N. J. Lewis, formerly works comptroller, Holyoke (Mass.) Works, is succeeded by George Bourque.

I. X. Names Canadian Party Chief

A. V. Hargis, formerly with Stanolind Oil and Gas Company, has joined Independent Exploration Company of Houston as party chief for I. X.'s Party 17 making geophysical surveys near Edmonton, Alberta, Canada. He is from Goliad, Texas.

Baker Eastern Manager Transfers

Albert K. Kline, formerly Eastern district manager for Baker Oil Tools, Inc., Olney, Ill., has been transferred to Tulsa as assistant to R. C. Glover, Mid-Continent area manager.

WHEN THE CHIPS ARE DOWN
AND THE GOING'S ROUGH ...
ANYWHERE SERVICE ANYTIME
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RED SEAL CONTINENTAL
STEWART & STEVENSON SERVICES, INC.
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You can always depend upon STEWART & STEVENSON Service
Stewart & Stevenson's factory-trained mechanics are always ready for your service call, ready anytime — night or day — regardless of where you may be . . . or what the circumstances. They drive fast panel trucks—fully equipped with all the necessary parts and tools to get your engine back on the line in the shortest possible time.
2060

WECO "Junior"

GIVES YOU 2 NEW FEATURES IN UNION CONSTRUCTION

1 THE ONLY UNION WITH METAL-TO-METAL SEAL PLUS A SEAL-PROTECTING GASKET

2 FULLY INTERCHANGEABLE PARTS

"Junior" has inherited all the fine qualities which have made WECO UNIONS outstanding favorites of the Oil Industry for more than 15 years.

In addition to the famous WECO-metal-to-metal seal, provided by ball and cone seating, WECO "Junior" has a resilient, replaceable gasket to act as a supplementary seal and protect the metal sealing surfaces against abrasion and corrosion from line fluids and gases. WECO's years of experience in "precision-manufacturing" unions make it possible to assure complete interchangeability of parts.

WECO "Junior" is an all-steel, heavier wall union for 3000 lbs. non-shock cold working pressure. It makes up faster, seals perfectly and withstands more abuse. Its knurled sub ends prevent wrench slippage—a safety feature. Pipe end threads are checked for lead, taper, depth and thread form to assure fast and easy make-up. Nut and female sub have rugged acme threads.

WECO "Junior" unions are available in sizes from ⅛" through 2", with hexagon nut. Information about wing nuts furnished on request. These unions are packed in convenient size cartons for easier handling and safe-keeping. Ask your supply store for WECO "Junior" Unions.

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HOUSTON 1, TEXAS

Exclusive Sales Representative Outside Mid-Continent Area

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Export Sales: CHIKSAN EXPORT COMPANY, Brea Calif. New York 7

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Manufacturers and Distributors of Oilfield, Refining, Marine, and Industrial Equipment

New Books

West Texas Oil

"West Texas Oil" is a study of the petroleum industry in 55 counties of the West Texas Permian Basin, by Frank J. Gardner, geologist on the staff of the Rinehart Oil News Company. The two-volume publication records the history of petroleum development in the area, from the first non-commercial production in 1902 to the present deep-drilling activities.

Geology of the Permian Basin is reviewed by the author, who illustrates the data with stratigraphic charts and maps. Detailed statistics are presented to summarize the present economic status of the region. Sections are also devoted to proration and conservation measures, a tabulation of industrial plants operating in the area, and pipe line activities in West Texas.

The greater part of the review is a compilation of individual field data, by counties. A map of the county introduces each section, which includes data on location, history, discoveries, structure, productive horizons, etc.

The Rinehart Oil News Company, 2411 North Pearl, Dallas, $25.

Geography of Petroleum

A geography of world petroleum has been compiled by a group of petroleum geologists, headed by Wallace Pratt, under the sponsorship of the American Geographical Society. The comprehensive volume, "World Geography of Petroleum," contains new material, including 50 specially prepared maps and numerous tables and diagrams.

Princeton University Press, Princeton, N. J.

Natural Gas Economics

A 280-page book, "Natural Gas Economics," by Joseph A. Kornfeld, reservoir engineer, Sohio Petroleum Company, Oklahoma City, presents a study of the role natural gas plays in energy sources, its place in the national economy, and modern concepts of conservation. It discusses synthetic fuels and emphasizes applications of old and new processes, to manufacture basic industrial chemicals from raw gas and includes cost figures. Kornfeld is a graduate of Oklahoma University and served with Skelly Oil Company, Cities Service Oil Company and Interstate Oil Compact Commission before joining Sohio.

The Transportation Press, Dallas.

Heat Exchangers

Manufacturers of shell and tube sheet exchangers have published a 94-page book on "Standards of Tubular Exchanger Manufacturers Association," 1949 Edition. The illustrated volume covers fabrication and performance of exchangers, mechanical standards, material specifications, fouling factors, temperature data; heat transfer and pressure drop data, thermal properties of fluids, installation, operation and maintenance, and tubing characteristics.

George P. Byrne, Jr., secretary-treasurer, Tubular Exchanger Manufacturers Association, Inc., 53 Park Place, New York 7, N. Y., $3.

Subsurface Logging

A group of papers presented by geologists, engineers and service company representatives before a Symposium on Subsurface Geology at the University of Oklahoma are included in a new 113-page book.

The book, entitled "A Symposium on Subsurface Logging Techniques," was edited by Carl A. Moore of the University's Department of Geology. Eleven papers are presented, illustrated with charts, sketches, and photographs. Subjects deal with various types of logs, drill-stem testing pro-

Maps and Movies

cedures and interpretation, and determination of relative permeability.

University Book Exchange, University of Oklahoma, Norman, Okla., $1.95 plus postage.

Tennessee Stratigraphy

Character of all rocks which crop out in Central Tennessee and which lie below the Chattanooga shale is described in Bulletin No. 56, "Pre-Chattanooga Stratigraphy in Central Tennessee."

Professor C. W. Wilson, Jr., of Vanderbilt University, author of the report, has mapped by reconnaissance methods the outcrop areas of all Pre-Chattanooga formations which had not been mapped previously. Sixteen stratigraphic units are shown on the entire map, which is compiled to the scale of one inch to the mile.

Tennessee Division of Geology, G-5, State Office Building, Nashville, Tenn., $2.65.

Kansas Production

A history of production from eastern Kansas counties and statistics on production from all Kansas counties are included in "Summary of Secondary Recovery Production Statistics and Estimated Water-Flood Reserves, Kansas, 1948." The report was compiled by Albert E. Sweeney, Jr., director of the Secondary Recovery division of IOCC.

Interstate Oil Compact Commission, P. O. Box 3127, State Capitol, Oklahoma City 5, Okla.

Mineral Economics

"Economics of the Mineral Industry," Volume 45, Number 1A, of the Quarterly of the Colorado School of Mines, is the first number of the 75th anniversary volume entitled "Mineral Resources in World Affairs," which will make available all of the papers presented and much of the discussion at the conferences on the occasion of the 75th anniversary of the school.

Included are "Mineral-Resource Appraisal by the United States Geological Survey," by S. G. Lasky, chief of the Mineral Resources Section of the U. S. Geological Survey, Washington, D. C.; "Oil and Human Welfare," by Max W. Ball, oil and gas consultant, Washington, D. C.; and "Gold, Our Most Strategic Mineral," by Donald H. McLaughlin, president of the Homestake Mining Company, San Francisco.

Department of Publications, Colorado School of Mines, Golden, Colo., 50 cents.

Secondary Recovery

Results of a U. S. Bureau of Mines study of the rates and pressures used for injecting water into several sandstone formations in the Mid-Continent fields to stimulate the recovery of oil are presented in a new technical report which also describes test procedures.

The studies were conducted in 11 fields in southeastern Kansas, northeastern Oklahoma, and North Texas. Their purpose was to learn more about the mechanics and efficiency of water flooding, and to provide useful information for operators using this secondary-recovery method.

The report discusses the theory of water injection, and describes the method used for measuring injection rates and pressures. It also includes detailed results of tests made in each of the fields studied. Diagrams and tables supplement the text.

Report of Investigations 4600, "Injection Rates and Pressures for Water Flooding Mid-Continent Oil Sands," was written by Peter Grandone, Bureau petroleum engineer, and J. B. Holleyman, formerly Bureau junior chemist.

U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13.

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Cover-All* Goggle Style CC60

Wearing comfort, more than anything else, will move safety goggles off the forehead on to the eyes. In Cover-All* goggles, as in all WILLSON protective equipment, comfort plays a big part in their design. The large, deep eyecups allow plenty of room for wearing prescription spectacles—and they are molded with rolled edges to fit facial contours around the eyes. The soft, leather bridge adjusts to the correct distance between the eyes and the adjustable headband provides for proper head size.

Don't fail to consider personal comfort if you want eye safety equipment worn as intended.

NEW CATALOG

In addition to product information, it contains information on safety glass, filter glass, respiratory hazards, etc., which will help you select proper safety equipment to meet specific hazards. Send for it!

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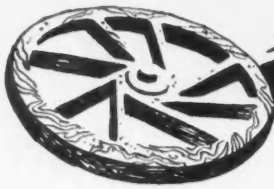

SQUEAKS from the BULLWHEEL

Impertinent

Three Polish soldiers trying to learn English were talking about a married comrade who, unfortunately, was not a father, much to his disappointment.

"His wife," said one soldier, "is unbearable."

"No, no," said another soldier. "That's not the right word. She's inconceivable."

Whereupon the third man spoke up: "You're both wrong; you mean that she's impregnable."

First-Class

A contractor went out to look over one of his postwar homes. Walking up to a house in which a carpenter was working, he whispered: "Can you hear me through this wall?"

"Yep!"

"Can you see me?"

"Not very well."

"That," said the contractor jubilantly, "is what I call a darn good wall."

Or Like Cellophane

A modern girl's bathing suit is like a barbed wire fence: it protects the property without obstructing the view.

Laughing Stock

A cub reporter rushed back from the livestock show he had been assigned to cover.

"I've got the perfect news story," he told the city editor.

"Man, calm down," said the editor. "What happened?"

"Well," replied the reporter, "a bull threw a Congressman."

Viewpoint

"Mandy," said the dusky woman's mistress, "I've heard about your hard luck. And I'm terribly sorry."

"Deed, ma'am, Ah ain't had no bad luck."

"But your husband—wasn't he killed in an accident yesterday?"

"Oh, yes'm; but dat's his hard luck, not mine."

Correct Reply

A minister was very fond of cherry brandy, and one of his elders thought he would play a joke on him.

"I'll give you a bottle of cherry brandy," he said, "if you will promise to acknowledge it in the church magazine."

The minister undertook to do this, and in due course a paragraph appeared in the magazine, thanking the donor for his gift of fruit and the spirit in which it was given.

Injun-uity

The squaw and papoose were on the platform at a jerkwater stop in South Dakota when the train pulled in. A gentleman from the East, pointing his finger at the papoose, inquired: "Him Injun?"

"Him part Injun, part injineer!" replied the squaw.

Viewpoints

A race track is a place where windows clean people.

•

Men are like matches: When they flare up they lose their heads.

•

When a girl's face is her fortune, it usually runs into an attractive figure.

•

The average girl needs beauty more than brains because the average man can see better than he can think.

Expert

An X-ray and an ex-wife can tell you all there is to know about a man.

Half-Baked

The lonely baby chick took a look around the electric incubator of unhatched eggs and said: Well, it looks as if I'll be an only child. Mother's blown a fuse!

Double Precaution

Two cowboys were about to leave for a trip to the Arizona desert. One of them was talking to a stranger who inquired about their equipment.

"My pardner and me are travelin' light. He's takin' nuthin' but whiskey for rattlesnake bites."

"And what are you taking?"

"Two rattlesnakes."

Specify **PELCO** Welding Saddles

PELICAN WELL TOOL & SUPPLY CO.

P. O. Drawer 1108
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SEE YOUR NEAREST SUPPLY HOUSE

10 GOOD REASONS WHY OPERATORS PREFER

McCullough
GUN PERFORATOR SERVICE

1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically: guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from 1/8" dia. up to 3/4" dia., to fit every possible need.
7. **BURRLESS BULLETS,** giving a completely burr-free hole, eliminating casing scraping, with *no* sacrifice of penetration.
8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

These Are Some of the Reasons Behind the Proven Fact That

McCullough

PUTS THE SHOTS WHERE THEY COUNT!

McCullough TOOL COMPANY

5820 South Alameda St., Los Angeles 11, California
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EXPORT OFFICE: 30 Rockefeller Plaza, New York 20, N. Y.

Flashes from the BEACON

IF YOU MISSED the January BEACON, you may not have learned that BS&B has acquired the very considerable talents of Johnson Roney II of Clearwater, Florida, to serve Sunshine State users of our small but important items in the SAFETY HEAD and vent valve lines. Mr. Roney's picture appeared in the January issue, along with full particulars . . . and we might be able to find a copy for you, if you'll hurry a request along.

* * *

". . . and this, Mr. Bingley, is our big press that . . . Mr. Bingley . . . Mr. Bingley . . . Where are you, Mr. Bingley?"
a BEACON Original by Dave Hunt and Roy Parmenter.

* * *

IN LAUNCHING its fourth calendar year, the BS&B BEACON is continuing its policy of "something for everybody"—or "if you don't see it, scold us!" As always, we are in the market for boos, pats, inquiries, complaints, and suggestions. You readers are our real editorial board and we love to please you.

* * *

THE BS&B BEACON, the *different* company magazine has things-in-store for early issues. Watch for the New Orleans story in our "Parade of Cities" . . . and the "Life and Times of Panhandle Eastern Pipe Line," both coming up soon.

* * *

We'd like to send you the BS&B BEACON regularly, if you're not one of our "Subscribers" now. No charge, of course. Just a request on your company letterhead will do the trick. Write to:

BLACK, SIVALLS & BRYSON, INC.
Industrial and Public Relations Division
720 Delaware
Kansas City, Missouri

SQUEAKS from the BULLWHEEL

Bare Facts

Officer: "Look here, sailor! What's the idea of wearing a barrel? Are you a poker player?"

Sailor: "No, but I just spent a couple of hours with some guys who are."

Nickname

There was a man who called a spade a spade until he stumbled over one in the dark.

You Can Look it Up

"You wrote out a policy on a 92-year-old man!" gasped the insurance branch manager.

"Sure," replied the new and elated salesman, "our statistics show that few men die after 92."

Sharpshooter

Drugstore clerk: "Did you kill any moths with those moth balls I sold you the other day?"

Customer: "No, I tried for five hours, but I couldn't hit one."

Young and Gay

"The people won't elect me because of my youth."

"But you're over 50 years and your youth is spent!"

"That's the trouble—they found out how I spent it."

Clerical Problem

A woman telephoned her bank to arrange for the disposal of a thousand dollar bond. "Is the bond for redemption or conversion?" a clerk inquired. There was a long pause, then the woman asked: "Am I talking to the First National Bank or the First Baptist Church?"

Child Guidance

The best way to drive a baby buggy is to tickle its little feet.

Cause of Courtesy

Standing in a crowded street car, a rather buxom woman was vainly trying to find a token for carfare. All her pockets had been tightly buttoned as a precaution against pickpockets, and no little commotion resulted.

"Please let me pay your fare," said the man beside her.

"Nothing of the kind," she replied, continuing the search. "I've got the fare here some place."

"I'm sure of it lady," said the man, "but I'd like to pay your fare. You've unbuttoned by suspenders three times already."

Wooden Expression

Sweet Young Thing: "Ah, Professor, what would this old oak say if it could talk?"

Professor: "It would say, 'I am an elm.' "

Dangerous Protection

While we believe insurance is a fine thing to have, we do know of one fellow with so much life insurance that his wife is mad every morning when he wakes up.

Blow the Man Down

Boxer: "Have I done him any damage?"

Disgusted Second: "No, but keep swinging, the draft might give him a cold."